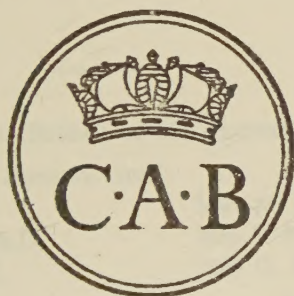


HELMINTHOLOGICAL ABSTRACTS

incorporating

BIBLIOGRAPHY OF HELMINTHOLOGY

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Abstracts in the present number are by:

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INCORPORATING BIBLIOGRAPHY OF HELMINTHOLOGY

FOR THE YEAR 1956

Vol. 25, Part 4

156—Acta Gastro-Enterologica Belgica.

- a. DEROM, E., MEIRSMAN, J. L., LANDSHEERE, B. C. DE & DEROM, F., 1956.—“Extraction d'une grande douve vivante du cholédoque chez un malade atteint de lithiase biliaire et d'ictère hémolytique familial. Première observation belge de distomatose humaine par *Fasciola hepatica*.” 19 (3), 219-229. [English, German, Spanish & Dutch summaries pp. 227-228.]

157—Acta Medica Scandinavica.

- a. SIURALA, M., 1956.—“Gastric lesion in some megaloblastic anemias. Results of follow-up examinations.” 154 (5), 337-348.

(157a) Siurala finds that, while lesions of the mucous membrane in pernicious tapeworm anaemia are actually caused by the tapeworm, the histamine-fast achlorhydria in many untreated patients is to some extent attributable to an inhibitory process exerted either by the deficiency state or by the tapeworm. R.T.L.

158—Acta Zoologica. Budapest.

- a. ANDRÁSSY, I., 1956.—“Eine interessante Nematodenfauna der Gerste. Nematologische Notizin. 4.” 2 (4), 307-317.

(158a)—Andrássy found the following eelworms associated with barley: *Pelodera lambdiensis*, *Mesorhabditis monhystera*, *Rhabditis gongyloides*, *Panagrolaimus rigidus*, *Eucephalobus striatus*, *Acrobeloides bütschlii*, *A. enoplus*, *Chiloplacus symmetricus*, *Aphelenchoides parietinus*, *Plectus granulosus*, *Tylenchorhynchus* sp., *Dorylaimus obtusicaudatus*, *D. nothus* and two new species *Dorylaimus laetificans* n.sp. and *Mirolaimus mirus* n.g., n.sp. These last two are described and figured. *D. laetificans* differs from all other dorylaims in the flask-shaped head end with its small head; the cuticle is thick, the spear short but strong and the male tail has 20 pre-anal papillae and five pairs of post-anal papillae. *Mirolaimus mirus* is placed in the Nygolaiminae; its mouth cavity is in two parts, the anterior spear-less and the posterior carrying a reduced spear, the oesophagus is regularly cylindrical, there are an oesophago-intestinal valve, paired gonads and a short rounded tail, with terminal gland openings. J.B.G.

159—Agricultural Journal. Department of Agriculture, Fiji.

- a. MORWOOD, R. B., 1956.—“A preliminary list of plant diseases in Fiji.” 27 (1/2), 51-54.
b. OHMAN, A. F. S., 1956.—“A brief account of the animal health position in the Crown Colony of Fiji.” 27 (1/2), 55-57.

(159a) The plant diseases of Fiji are listed under each plant host, with the scientific name of each pathogen and the name by which the disease is commonly known. The only helminths mentioned are *Tylenchus similis* in the banana and *Heterodera radiculicola* in the tomato. R.T.L.

(159b) The control of internal parasites of cattle, goats, horses and poultry and of *Stephanurus dentatus* in pigs and the treatment of *Dirofilaria immitis* in dogs are included among the major animal health problems in Fiji. *D. immitis* affects about 90% of the canine population and when untreated causes many deaths. R.T.L.

160—American Journal of Clinical Pathology.

- a. DIMMETTE, R. M., ELWI, A. M. & SPROAT, H. F., 1956.—“Relationship of schistosomiasis to polyposis and adenocarcinoma of large intestine.” 28 (3), 266–276.

161—American Journal of Hygiene.

- a. MELVIN, D. M., SADUN, E. H. & HEIMLICH, C. R., 1956.—“Comparison of the direct smear and dilution egg counts in the quantitative determination of hookworm infections.” 64 (2), 139–148.
 b. SVENSSON, R., 1956.—“Intestinal parasites in Himalayan regions.” 64 (2), 158–169.

(161a) A comparison of the direct smear and dilution techniques used in the quantitative determination of the number of hookworm eggs per gramme in faeces is made. With human faeces both methods gave very little deviation from random distribution, although in a few samples containing a high number of eggs there was a significant overdispersion. With dog faeces containing *Ancylostoma caninum* eggs there was greater variance by both methods. One method was not more advantageous than the other when used by different investigators. With both techniques some obtained consistently lower egg counts than others. Practically all the infections missed by the smear method are too light to be of public health significance.

R.T.II

(161b) During a visit to the village of Kathmandu (altitude 4,500 ft.) and a Sherpa village in Helembu (9,000 ft.) in Nepal and to Kalimpong (4,000 ft.) a town of about 12,000 inhabitants in West Bengal near the Nepal frontier, Svensson examined the faeces of 500 individuals for intestinal parasites. The results were mostly protozoological but one table sets out the percentage of *Ascaris*, *Trichuris* and hookworm ova found in these three localities. In Kalimpong the low incidence of *Ascaris* and *Trichuris* indicated that the influence of Western hygiene and sanitation had had a marked preventive effect on hand to mouth infections but a relatively high incidence of hookworm was connected with barefooted work in fields and gardens. The data support the presumption that high altitude combined with dry climatic conditions inhibits the development of eggs and larvae to the infective stage.

R.T.II

162—American Journal of Pathology.

- a. DENT, J. H., NICHOLS, R. L., BEAVER, P. C., CARRERA, G. M. & STAGGERS, R. J., 1956.—“Visceral larva migrans: with a case report.” 32 (4), 777–803.

(162a) Biopsy of the liver of a child 19 months old who later died from homologous serum hepatitis showed numerous focal granulomata containing *Toxocara canis* larvae. At autopsy similar granulomata with or without larvae were widely scattered throughout the liver, lungs, muscles, intestinal wall, brain, pancreas, renal cortex, mesenteric glands, spinal cord, pons, cerebellar peduncle and cerebral cortex. It is suggested that the larvae found by Wilder (1950) in the human eye, and by Beautyman & Woolf (1951) in the human brain, were *Toxocara* larvae.

R.T.II

163—American Journal of Roentgenology, Radium Therapy and Nuclear Medicine.

- a. FRANCKE, W., 1956.—“Roentgenologic findings of small intestine in 100 repatriated prisoners of war. Deficiency states and worm infestations.” 76 (1), 149–152.

164—American Journal of Surgery.

- a. FEATHER, H. E., KUHN, C. L., RIKE, P. M. & BASS, M. A., 1956.—“Hydatid cyst of the liver.” 91 (3), 452–455.

165—American Journal of Tropical Medicine and Hygiene.

- a. MOORE, D. V. & SANDGROUND, J. H., 1956.—“The relative egg producing capacity of *Schistosoma mansoni* and *Schistosoma japonicum*.” 5 (5), 831-840.
- b. HSÜ, H. F. & AMEEL, D. J., 1956.—“Intradermal reactions to *Schistosoma japonicum* and *S. mansoni* antigens in schistosome dermatitis cases.” 5 (5), 841-846.
- c. SAWADA, T., HARA, K., TAKAGI, K., NAGAZAWA, Y. & OKA, S., 1956.—“Cytochemical studies on the hepatic tissue of mice following infections with *Schistosoma japonicum*.” 5 (5), 847-859.
- d. LOPES DE FARIA, J., 1956.—“Pulmonary arteriovenous fistulas and arterial distribution of eggs of *Schistosoma mansoni*.” 5 (5), 860-862.
- e. RIVERA, J. V., RODRIGUEZ, H. F. & PÉREZ-SANTIAGO, E., 1956.—“Thrombocytopenic purpura due to fuadin (Stibophen).” 5 (5), 863-868.
- f. WOLFGANG, R. W. & POOLE, J. B., 1956.—“Distribution of *Echinococcus* disease in northwestern Canada.” 5 (5), 869-871.
- g. MANKAU, S. K., 1956.—“Studies on *Echinococcus alveolaris* (Klemm, 1883), from St. Lawrence Island, Alaska. III. The histopathology caused by the infection of *E. alveolaris* in white mice.” 5 (5), 872-880.
- h. ATCHLEY, F. O., WYSHAM, D. N. & HEMPHILL, E. C., 1956.—“Mass treatment of ascariasis with a single dose of piperazine citrate.” 5 (5), 881-887.
- i. MALDONADO, J. F., 1956.—“An evaluation of the standardized direct smear for egg counting in parasitological work.” 5 (5), 888-892.
- j. HARRY, H. W. & CUMBIE, B. G., 1956.—“Stream gradient as a criterion of lotic habitats suitable for *Australorbis glabratus* in Puerto Rico.” 5 (5), 921-928.
- k. YOELI, M., 1956.—“Some aspects of concomitant infections of plasmodia and schistosomes. I. The effect of *Schistosoma mansoni* on the course of infection of *Plasmodium berghiei* in the field vole (*Microtus guentheri*).” 5 (6), 988-999.
- l. LAWLESS, D. K., KUNTZ, R. E. & STROME, C. P. A., 1956.—“Intestinal parasites in an Egyptian village of the Nile valley with emphasis on the protozoa.” 5 (6), 1010-1014.
- m. SCHWETZ, J., 1956.—“Some new comparative investigations on three *Physopsis* borne schistosomes: *Schistosoma haematobium*, *S. bovis* and *S. intercalatum*.” 5 (6), 1071-1085.
- n. RAUSCH, R., 1956.—“Studies on the helminth fauna of Alaska. XXX. The occurrence of *Echinococcus multilocularis* Leuckart, 1863, on the mainland of Alaska.” 5 (6), 1086-1092.
- o. BONNET, D. D., KESSEL, J. F., KERREST, J. & CHAPMAN, H., 1956.—“Mosquito collections and dissections for evaluating transmission of filariasis in Polynesia (Tahiti).” 5 (6), 1093-1102.
- p. THOMPSON, J. H., 1956.—“ACTH as an adjunct to the treatment of loiasis.” 5 (6), 1103-1105.

(165a) Moore & Sandground have investigated the relative egg producing capacity of *Schistosoma mansoni* and *S. japonicum* in hamsters, using a dilution technique for counting eggs in the faeces and viscera. Each female *S. mansoni* produced an average of 300 eggs per day as compared with 3,500 per day for *S. japonicum*. The highest percentage (32%) of *S. mansoni* eggs was found in the small intestine while the highest percentage of *S. japonicum* eggs (50%) was found in the large intestine. There was no essential difference in egg production between the Formosan and Japanese strains of *S. japonicum* in hamsters. D.L.H.R.

(165b) Hsü & Ameel performed intradermal tests on 49 recent or old cases of schistosome dermatitis and 49 controls, using a worm antigen of *S. japonicum* and a cercarial antigen of *S. mansoni*. The results were negative. They therefore conclude that the use of intradermal antigens for the diagnosis of human schistosomiasis is valid even in areas where people may well have been exposed to avian schistosome cercariae. D.L.H.R.

(165c) The cytochemical changes which occur in the hepatic cells, ground substances of the connective tissue and haemosiderin-like pigment in Kupffer cells of the liver of mice infected with *Schistosoma japonicum* consist in a marked increase in glycogen and fat and a decrease of ribonucleic acid in the cytoplasm of the hepatic cells with the frequent occurrence of nuclear karyorrhexis. There was also an excessive accumulation of acid mucopolysaccharides in the connective tissue of schistosomal granulomata and in the walls of the portal vessels. The eosinophilic deposits about the schistosome eggs were polysaccharides closely related to egg-shell substance. The lack of iron in the haemosiderin-like pigment in the Kupffer cells shows that it is very similar to melanin but is soluble in 40% alcohol sulphate and is decolorized by potassium permanganate, chlorine and bromine. R.T.L.

(165d) From necropsy evidence Lopes de Faria suggests that the arteriovenous fistulae caused by the eggs of *Schistosoma mansoni* in the lungs may constitute a route through which these eggs gain entrance into the systemic arterial system.

D.L.H.R.

(165e) In a patient with schistosomiasis mansoni, who received three courses of 40 ml. each of foudadin at intervals of a month, petechiae on his legs and transient blood streaks in his saliva appeared after each injection in the second course and after the second and third injections of the third course, the fourth injection of which was followed by giddiness, general malaise, bloody expectorations, haematochezia, hoarseness and wide-spread haemorrhagic eruption. Plasma from the patient to a recipient, who also received foudadin, produced thrombocytopenia without purpura. It is suggested that the thrombocytopenic purpura was due to the appearance in the patient's plasma of a drug-antibody complex which was able to agglutinate or lyse platelets, depress megakaryocyte activity and produce capillary damage.

R.T.L.

(165f) As antigen prepared from sheep hydatids in Australia proved unsatisfactory when used in Canada, an antigen was prepared by precipitating matter from fresh reindeer hydatid fluid to which a 1:20,000 merthiolate solution was added. In 1954 38% of 293 Indians in the Yukon district, 41.5% of 1,145 natives in the Mackenzie River district and 13.5% of 584 natives belonging to the Great Slave Lake bands proved positive to the antigen skin test. In all, 31% of the 2,022 natives tested gave positive reactions to this Canadian antigen. In north-western Canada, the main reservoirs of hydatid are the wolf, moose, elk, caribou and reindeer. Seven out of 27 Indian dogs in the villages on the Mackenzie River were found to be infected with *Echinococcus*.

R.T.L.

(165g) The pathology of *Echinococcus alveolaris* infection differs from that of *E. granulosus* because of its malignant invasion of the host's tissues by successive exogenous and endogenous budding. White mice were experimentally infected with material obtained from naturally infected foxes, from St. Lawrence Island, and the histopathological changes in the liver, lung, kidney, spleen, pancreas and walls of the oesophagus, stomach and duodenum are described. The embryo, hatched in the intestine, travels by the blood stream to the liver and other organs, where it forms a cyst. Rupture of this primary cyst releases brood capsules, scolices or germinal membrane which are carried by the lymph or blood stream to other sites, thus establishing additional foci of infection. Perivascular infiltration with mononuclear cells is a characteristic feature.

R.T.L.

(165h) Single doses of piperazine citrate, in three different dosage schedules, were used for the mass treatment of 282 persons with *Ascaris lumbricoides* infection in the eastern Kentucky mountains. Of those who also received phenolphthalein before and after treatment, 64% had the faecal egg count reduced to nil. But in a group in which the laxative was omitted the rate of cure was 79%. Single dosage is considered an effective public health measure for *Ascaris* control, owing to its convenience and reliability.

R.T.L.

(165i) Beaver's standardized direct smear and Stoll's dilution egg count methods were applied to 1,100 samples of faeces containing ova of *Ascaris* (411), *Trichuris* (951), *Necator* (449) and *Schistosoma mansoni* (310). In general the two procedures compared favourably but Maldonado concludes that Beaver's method is the technique of choice.

R.T.L.

(165j) During a study of *Australorbis glabratus* at over 350 collecting places on streams in Puerto Rico, it was observed that long reaches with less than 0.010 gradient were often favourable for the molluscan populations but reaches of low gradient immediately below extensive high gradient headwater areas were generally unfavourable and reaches of streams of more than 20 metres fall per 1,000 metres of length were too steep for the development of a population. A certain amount of organic enrichment was advantageous but intense pollution created adverse conditions for *A. glabratus*, which was not found in streams from limestone formations.

R.T.L.

(165k) Yoeli describes separately the gross pathology and histopathology found in field voles, *Microtus guentheri*, following (a) percutaneous infection with *Schistosoma mansoni* cercariae, (b) inoculation with mouse red cells parasitized by *Plasmodium berghei* and (c) the pathological changes resulting from the inoculation of *P. berghei* before and after infection with *S. mansoni*. In these mixed infections the plasmodial infection became markedly chronic especially if the inoculation had preceded or followed the schistosome infection by one or two weeks. In those voles inoculated with *P. berghei* four to seven weeks after the schistosome infection the course of the plasmodial infection was mild and the parasitaemia was low. This is attributed to the increased phagocytic power of the host induced by the schistosome infection.

R.T.L.

(165l) The incidence of helminth eggs based on the examination of six faecal samples each taken at intervals over $2\frac{1}{2}$ years from the same 80 individuals in an [unspecified] Egyptian village was: hookworm 71%, *Ascaris lumbricoides* 51%, *Trichuris trichiura* 9%, *Enterobius vermicularis* 59%, *Hymenolepis nana* 23%, *Trichostrongylus* sp. 70% and a single infection with *Strongyloides stercoralis*.

R.T.L.

(165m) From his experimental study of *Schistosoma bovis*, *S. intercalatum* and *S. haematobium*, with particular reference to their transmission through *Physopsis* and laboratory animals, Schwetz proposes the addition of a new classification of African schistosomes to those already in existence. He divides them into two groups; the first, containing only *S. haematobium*, is characterized by being the cause of vesical bilharziasis in man, transmissible to other primates where it produces identical lesions, completes its life-cycle and is transmissible to small laboratory animals in which it does not produce the same lesions and does not complete its life-cycle; the second, containing *S. mansoni*, *S. bovis*, *S. rodhaini* and *S. intercalatum*, is characterized by causing intestinal bilharziasis and by being transmissible to small laboratory animals where they produce the same diseases and complete their life-cycles. Schwetz has confirmed that *S. intercalatum* can be transmitted to sheep and goats and discusses the possible identity of this species with *S. mattheei*.

S.W.

(165n) Rausch agrees with Vogel that *Echinococcus sibiricensis* Rausch & Schiller, 1954 is identical with and becomes a synonym of *E. multilocularis* Leuckart, 1863. Its presence in continental North America is now reported for the first time. It is widely distributed in foxes and dogs in Alaska, and may be introduced by dogs into southern Canada and the U.S.A. The biological and morphological characteristics of *E. multilocularis* and *E. granulosus* are tabulated and their gravid segments figured.

R.T.L.

(165o) An intensive survey method for the collection of mosquitoes for examination for filaria larvae, of which preliminary accounts have already been published by Kessel *et al.* (1953, 1954), is described in detail and has been applied to *Aedes polynesiensis* in Tahiti. As the information obtained from the dissections can be related to the relative abundance of the mosquitoes and the exact locality in which they were captured, it can serve as a supervisory yard stick on the reduction of microfilarial infection in control programmes in which diethylcarbamazine is distributed and provides an early indication if the drug treatment programme is not being executed correctly. It also assists in the detection of localities where infective mosquitoes are still to be found.

R.T.L.

(165p) The severe pain which followed the administration of hetrazan to a case with Calabar swellings and urticarial rash was dramatically relieved by the addition of ACTH therapy. It is suggested that corticosteroids might give symptomatic benefit also in the treatment of onchocerciasis and might be useful as a provocative test in cases of suspected filariasis by increasing the number of microfilariae in the blood.

R.T.L.

166—American Journal of Veterinary Research.

- a. KARTMAN, L., 1956.—“Notes on the encapsulation of *Dirofilaria immitis* in the mosquito *Aedes aegypti*.” 17 (65), 810-812.

(166a) Kartman has tabulated the number of microfilariae of *Dirofilaria immitis* found encapsulated in *Aedes aegypti* during the first 20 days after an infective meal. Most of the encapsulated forms were still in the microfilarial stage, some were only partially enclosed. The first seen were found on the 3rd day. Only a few sausage stage forms were encapsulated, the first being found on the 8th day. The number of mosquitoes with encapsulated forms increased with the passage of time.

R.T.L.

167—American Midland Naturalist.

- a. PERKINS, K. W., 1956.—“Studies on the morphology and biology of *Acetodextra amiuri* (Stafford) (Trematoda: Heterophyidae).” 55 (1), 139-161.
 b. MIZELLE, J. D., STOKELY, P. S., JASKOSKI, B. J., SEAMSTER, A. P. & MONACO, L. H., 1956.—“North American freshwater Tetraonchinae.” 55 (1), 162-179.
 c. SEAMSTER, A. & MONACO, L. H., 1956.—“A new species of Rhamnocercinae.” 55 (1), 180-183.
 d. RISER, N. W., 1956.—“The hooks of taenioid cestodes from North American felids.” 56 (1), 133-137.

(167a) While other heterophyids parasitize birds or mammals *Acetodextra amiuri* is a parasite of fishes, in which its principal habitat is the ovary and, instead of the eggs being discharged, the entire worm is passed out by the host when it spawns. The morphology of the adult and of the miracidium are described. In spermatogenesis the cytoplasm as well as the nucleus contributes to the formation of the sperm. Attempts to determine the intermediate host were unsuccessful.

R.T.L.

(167b) The fresh-water species of Tetraonchinae in North America with their synonyms and localities are listed under their respective genera, four of which are North American and two are exotic genera with North American species. They are also listed under their various hosts. *Clavunculus* n.g. is made for *Actinocleidus bursatus* (Mueller, 1936) Mueller, 1937 as type. *A. bifurcatus* (Mizelle, 1941) and *A. unguis* (Mizelle & Cronin, 1943) are also transferred as new combinations to *Clavunculus* which resembles *Cleidodiscus*, but the haptor is umbrella-like, with scalloped margin, and the bases of each of the two pairs of anchors are connected by a bar, one articulating with the other.

R.T.L.

(167c) *Rhamnocercus stichospinus* n.sp. from the gills of *Micropogon undulatus* and *Menticirrhus littoralis*, taken in the Gulf of Mexico, differs in the following characters from the type and only species of the genus hitherto known; the cirrus is enclosed in a pellicle-like sheath, the edges of the peduncular spines curve upwards and inwards. The accessory haptor armament consists of a single row of accessory spines on each haptor surface adjacent to bars, a single row anterior to the dorsal bars and two pairs of ventral spines with a lateral clump of spines near each of the posterior pair of these ventral spines. The ventral bar is sharply tapered at each end and deeply notched at midlength. The dorsal anchor has the superficial root constructed near its middle. No acicular internal spicules were observed. The subfamily Rhamnocercinae, rejected by Hargis (1955), is reinstated and his inclusion of the genus *Rhamnocercus* in the Diplectaninae is rejected.

R.T.L.

(167d) As many species of *Taenia* are improperly identified and as various authors do not use constant methods in recording the sizes of the hooks, Riser has figured the hooks of six species, after removing them from scolices and mounting them in polyvinylalcohol, and has tabulated the dimensions, of the large and small hooks, under total length, handle and blade.

R.T.L.

168—*Annales de Médecine Vétérinaire*.

- a. GRÉGOIRE, C., POUPLARD, L., COTTELEER, C., SCHYNS, P., THOMAS, J. & DEBERDT, A., 1956.—"Nouvelle méthode de diagnostic. La distomatose." 100 (5), 294-303.

(168a) Grégoire and his colleagues describe a simple apparatus which they have found effective for examining bovine faeces for *Fasciola hepatica* eggs. It consists of a vertical column of glass tubing 2.1 m. high and 1 cm. in internal diameter connected by rubber tubing (which can be closed by a clip) to a glass stopcock with its lower opening 2 mm. in diameter. The distance between the glass tubing and the stopcock should be 5 cm. The tubing is filled with water, containing 1% of the detergent "Joy", to a height of 1.7 m. and the lower part of the stopcock is also filled to avoid foaming. Four grammes of faeces are shaken up in 36 c.c. of water (plus 1% "Joy") and passed through a 350 μ mesh sieve. The filtrate is then added rapidly to the top of the column of water in the tube and allowed to stand for 20 minutes. The clip on the rubber tubing is then closed and the stopcock slightly opened to allow the sediment to pass into the narrow part. By squeezing the rubber tubing gently below the clip the sediment can be collected drop by drop on microscope slides; the first fifteen drops contain almost all the eggs and very little debris. S.W.

169—*Annales de Parasitologie Humaine et Comparée*.

- a. GOLVAN, Y. J., 1956.—"Acanthocéphales d'oiseaux. Troisième note. Révision des espèces européennes de la sous-famille des Plagiorhynchinae A. Meyer 1931 (Polymorphidae)." 31 (4), 350-384.
 b. DOLLFUS, R. P. & CAMPANA-ROUGET, Y., 1956.—"Une nouvelle espèce d'*Ascarophis* (Nematoda, Spirurinae) chez *Gadus luscus* L. Révision du genre." 31 (4), 385-404.
 c. CHABAUD, A. G. & GOLVAN, Y., 1956.—"Nouvelle filaire parasite des grives en France." 31 (4), 405-413.

(169a) Golvan creates *Porrorchinae* n. subf. for the genera of the Plagiorhynchinae with a short spherical proboscis, viz., *Porrorchis*, *Pseudoporrorchis*, *Oligoterorhynchus*, *Lueheia* and (provisionally) *Sphaerechinorhynchus*. *Centrorhynchus* is not considered to be closely related to *Porrorchis* or *Pseudoporrorchis*. Those genera with a long proboscis remaining in the Plagiorhynchinae are *Plagiorhynchus* and *Prosthorhynchus*. Although the ganglion in the last two genera lies in the middle third of the proboscis sac, Meyer (1933) implied in his translation of the original description of *Prosthorhynchus* that in the latter genus it lay at the base of the sac. This has caused erroneous identifications and transferences which are now rectified. More precise diagnoses are given of *Prosthorhynchus* and *Plagiorhynchus*, the former as a parasite of terrestrial birds or accidentally of mammals, and the latter, of aquatic or subaquatic birds. *Prosthorhynchus* now contains *P. cylindraceus*, *P. rossicus*, *P. scolopacidis*, *P. formosus*, *P. longirostris*, *P. angrense*, *P. reheae*, *P. bazae* and probably *P. pittarum*. *P. genitopapillatus* and *P. upupae* are made synonymous with *P. cylindraceus*, apparently for the first time. *P. rosai* and *Echinorhynchus brumpti* are considered juveniles of *P. cylindraceus* encysted in an unusual host; further hosts now reported are *Talpa europaea* and *Eliomys quercinus*. The copulatory bursa of *P. cylindraceus* is described and figured in detail for the first time. The original record of *Corvus* sp. (later corrected to *Vanellus* sp.) as the host of *P. rossicus* is regarded as correct. *Plagiorhynchus* contains *P. crassicollis*, *P. charadriicola*, *P. rectus*, *P. paulus*, *P. linearis*, *P. spiralis*, *P. totani*, *P. charadrii*, *P. limnobaeni*, *P. menurae* and *P. reticulatus*. The specimens which Lundström identified as *Prosthorhynchus scolopacidis* are thought to be *Plagiorhynchus spiralis* or *P. totani*. *Plagiorhynchus odhneri* is now made a variety of *P. crassicollis*. On re-examination of the type specimens of *Plagiorhynchus charadriicola*, the ganglion was found in the middle third of the proboscis sac and not near the base. The species of *Prosthorhynchus* and *Plagiorhynchus* and six species of *Pseudoporrorchis* are listed with the original authors, their hosts and geographical areas. M.MCK.

(169b) In *Ascarophis crassicollis* n.sp. from *Gadus luscus* from La Rochelle, France, a thick cuticle covers the cervical region almost to the nerve ring. The eggs lack plugs or filaments. *A. upeneichthys* and *A. nototheniae*, now identified from an expedition to Australia and the

Antarctic, are given with their hosts and localities. Dollfus & Campana-Rouget present a new diagnosis for *Ascarophis* and amend in Chitwood & Wehr's diagnosis of the Spirurinae (1934) "gubernaculum present" to "gubernaculum rarely present". The various dimensions on record for *A. morrhuae* are tabulated; in the absence of figures or description in Nicoll's record (1907) of *A. morrhuae*, his specimens are relegated to *Ascarophis* sp.; Baylis's specimens (1933) are considered a different species and named *A. baylisi* nom. nov. Fourteen *Ascarophis* species and six species subsequently assigned to this genus are listed according to their localities and with their hosts; a key is given to the 14 species of which the male is known. *Metabronema* is considered a valid genus containing *M. magna*, *M. wardlei*, *M. caranxi*, *M. kosugii*, *M. ishii* and *M. amemasu*. Re-establishing *Cystidicoloides* Skinner, 1931, the authors assign to it *C. fischeri* (Travassos, Artigas & Pereira, 1928), *C. harwoodi* (Chandler, 1931), *C. salvelini* (Fujita, 1920), *C. truttae* (Baylis, 1935) and *C. prevosti* (Choquette, 1951). *Ascarophis murrayensis* also probably belongs to *Cystidicoloides*. The differences between *Cystidicola*, *Metabronema*, *Spinitectus*, *Cystidicoloides*, *Ascarophis* and *Parascarophis* are discussed and the chief ones tabulated.

M.MCK.

(169c) Chabaud & Golvan describe and figure *Carinema campanae* n.sp. collected in France from the thrushes *Turdus musicus* and *T. philomelos* (= *T. ericetorum*) and its remarkably long microfilaria from *T. musicus*. *C. campanae* differs from the type species in being opisthofelphic; it seems similar to *C. dubia* but no differential diagnosis is given. *Ornithofilaria mavis* is now recorded from *T. philomelos*. Its microfilaria, observed in *T. musicus*, is figured.

M.MCK.

170—Annales de la Société Belge de Médecine Tropicale.

- a. SCHWETZ, J., 1956.—"Sur les lésions hépatiques des rats sauvages naturellement infectés de *S. mansoni* var. *rodentorum* (et de *S. rodhaini*).¹" 36 (1), 105-111. [Flemish summary p. 111.]
- b. HUGON, J., 1956.—"Expérimentation du citrate de diéthylcarbamazine et de la paludrine dans les ascariidoses." 36 (2), 145-150. [Flemish summary pp. 149-150.]
- c. FAIN, A., DUREN, P. & FELS, P., 1956.—"Cysticercose généralisée et plasmocytome médullaire (myélome) associés chez une femme de race Muhutu." 36 (3), 239-246. [Flemish summary p. 245.]

(170a) Schwetz discusses briefly the hepatic lesions found in cases of schistosomiasis *mansoni* in man and in experimentally infected mice and quotes from Rodhain's observations on the pathology of *Schistosoma rodhaini* in African rodents. He then summarizes Gérard's report on the lesions in the livers of a number of wild African rodents collected by Schwetz and found to be infected with *S. mansoni* var. *rodentorum*, and in experimentally infected *Rattus rattus*. In none was there any cirrhosis; the lesions were mainly infiltrations with lymphocytes, sometimes mixed with polynuclear cells, localized in the portal spaces. In an addendum the lesions caused by *Capillaria* are described.

S.W.

(170b) Hugon has used carbilazine (piperazine citrate) and paludrine for the treatment of ascariasis in children. The former was given to 100 children, six months to ten years old, at a dose rate of 14 mg. per kg. body-weight daily for four days; the latter was given to 20 children between two and ten years old at a dose rate of 30 mg. per kg. daily for two days. Both drugs cured about 90% after one course and all were cured after a second course. Neither drug had any effect on hookworms which were present in some of the children. Hugon considers paludrine to be worthy of further investigation as an anthelmintic as it is without side effects and is extremely efficacious against ascaris.

S.W.

171—Annals of Allergy.

- a. WODEHOUSE, R. P., 1956.—"Antigenic analysis and standardization of *Trichinella* extract by gel diffusion." 14 (2), 121-138.

(171a) Wodehouse has demonstrated, using the gel diffusion techniques described by Oudin and by Ouchterlony, that there are at least ten precipitating antigens in *Trichinella spiralis* extract. The pattern of the formation of the precipitation bands with homologous

rabbit antiserum consists of an inner group of five bands, an outer group of four (of which one is heavier than the rest and is believed to represent the major antigen) and a more distal dissociated band. Heating to 58°C. for one hour affected neither the potency nor the precipitation pattern of the extract but heating to 100°C. completely destroys the major antigen and more or less weakens two others of the outer group. Autoclaving for one hour destroys all of the antigens except one of the outer group. Acidifying to pH 4 although precipitating some of the material did not affect potency or precipitation pattern. Trypsin digestion destroyed the antigens of the inner group; pepsin digestion destroyed all antigens except that one which also survived autoclaving. Sera from six active or convalescent cases of trichinelliasis gave precipitation patterns with the extract and the bands could be identified with the outer groups of the rabbit antiserum. Normal human serum and pooled γ -globulin were free from demonstrable *Trichinella* antibodies. There was a slight cross reaction with *Dipylidium caninum* but none with *Ascaris lumbricoides* or *Toxocara canis*. S.W.

172—Annals of Applied Biology.

- a. WALLACE, H. R., 1956.—“The emergence of larvae from cysts of the beet eelworm, *Heterodera schachtii* Schmidt, in aqueous solutions of organic and inorganic substances.” 44 (2), 274–282.
- b. DONCASTER, C. C., 1956.—“Some observations on the hatching responses of the cabbage-root eelworm, *Heterodera cruciferae* Franklin.” 44 (2), 283–291.
- c. STONE, L. E. W., 1956.—“On the control of potato-root eelworm (*Heterodera rostochiensis* Wollenw.) by chlorinated phenol and *p*-m-cresol in solubilized form.” 44 (2), 292–306.

(172a) The rate of larval emergence from cysts of the beet eelworm in amino-acids, carbohydrates and in other organic and inorganic substances was significantly higher than the emergence in water. Measurements of shrinkage of unhatched larvae in various concentrations of urea, sodium chloride and sucrose showed that decreasing rates of emergence at higher concentrations may be due to changes in the unhatched larvae brought about by an osmotic effect. High concentrations of beet diffusate may have a similar effect. H.R.W.

(172b) Doncaster found that larval emergence from cysts of *Heterodera cruciferae* was stimulated to a comparable degree by root diffusates from sprouts, swedes, rape-kale and white mustard. When mustard-root diffusate was added to leachings from the other species tested there was no apparent effect on larval emergence. For both sprouts and mustard-root diffusates the curve obtained by plotting cumulative hatch against log. time was sigmoid in form. Estimates were obtained of the log. activity values of leachings from the four species of plants tested and from soil, of which the last was mildly stimulating. C.C.D.

(172c) Solubilized phenols and cresols, applied on light sandy loam by low volume methods, killed up to approximately half the population of potato-root eelworm in the top eight inches of the soil. When nematicide distribution was aided by rotation on the same site, yields were approximately doubled compared with untreated areas. The eelworm population also increased but not so much as where no treatment had been applied. Under cold glass-house conditions on light loam, high volume methods greatly increased the yield of tomatoes but the soil population of potato-root eelworm also increased. Stone concludes that attempts to control potato-root eelworm in open ground by the application of solubilized chemicals at low volumes are ineffective. The usefulness of high volume methods is limited by the fact that a nematicidal surface seal is also required. H.R.W.

173—Annals of Internal Medicine.

- a. WALLACE, L., HENKIN, R. & MATHIES, A. W., 1956.—“*Trichostrongylus* infestation with profound eosinophilia.” 45 (1), 146–150.

(173a) Two cases of infection with *Trichostrongylus* sp., in a soldier and his wife, are reported from the U.S.A. The husband had spent a year in Korea and the wife had never left the U.S.A. Both had diarrhoea and abdominal pain with high eosinophilia, reaching 74% and 81% respectively, and marked leucocytosis. R.T.L.

174—Annals of Surgery.

- a. STONE, P. W., MACKAY, M., MELLISH, P. & LORD, Jr., J. W., 1956.—“Surgical therapy in schistosomal cirrhosis of the liver.” 144 (1), 79–86.

175—Annals of Tropical Medicine and Parasitology.

- a. CRISP, G., 1956.—“An ephemeral fauna of torrents in the Northern Territories of the Gold Coast, with special reference to the enemies of *Simulium*.” 50 (3), 260–267.
- b. BELL, E. J. & HOPKINS, C. A., 1956.—“The development of *Diplostomum phoxini* (Strigeid Trematoda).” 50 (3), 275–282.
- c. DUKE, B. O. L., CREWE, W. & BEESLEY, W. N., 1956.—“The relationship between the size of the blood-meal taken in by *Chrysops silacea*, the development of the fly's ovaries, and the development of the microfilariae of *Loa loa* taken in with the blood-meal.” 50 (3), 283–299.
- d. GORDON, R. M., 1956.—“The essential data required in a filariasis survey.” 50 (3), 314–321.
- e. WRIGHT, C. A., 1956.—“A note on the ecology of some molluscan intermediate hosts of African schistosomiasis.” 50 (4), 346–349.
- f. KERSHAW, W. E., ST. HILL, C. A., SEMPLE, A. B. & DAVIES, J. B. M., 1956.—“The distribution of the larvae of *Trichinella spiralis* in the muscles, viscera and central nervous system in cases of trichinosis at Liverpool in 1953, and the relation of the severity of the illness to the intensity of infection.” 50 (4), 355–361.
- g. JAMISON, D. G. & KERSHAW, W. E., 1956.—“Studies on the structure of the skin in the normal African and on the changes associated with infection with *Onchocerca volvulus*. II. The measurement of the changes which accompany ageing and infection.” 50 (4), 415–428.
- h. CRISP, G., 1956.—“Observations on the distribution and biting habits of *Simulium damnosum* in the Gold Coast.” 50 (4), 444–450.

(175a) Among the predators of *Simulium* larvae in the Red Volta River the nymph of *Neoperla spio* is perhaps the most formidable. *Chimarra* spp. also attack large numbers. *Afronurus* sp. often contained many chironomid larvae and, although only remnants of *Simulium* were found, it is suspected that it also is a *Simulium* predator. Fish are important enemies. *A. Phractura ansorgei* was full of *Simulium* larvae. Dragon-flies, the most important predators of adult *Simulium*, are most abundant during the rains when *Simulium* are active. Spiders may be formidable foes. *Mermis* were seen twice in adults and once in the larvae of *S. damnosum*. R.T.L.

(175b) The metacercariae of strigeid trematodes obtained from the peritoneum, pericardial cavities, eye or brain of the host are useful for the study of helminth physiology on account of their small size and rapid development. *Diplostomum phoxini* occurs in 100% of the minnows in the west of Scotland. In ducks the development to the adult form is in three overlapping stages, each of about 24 hours duration, and sexual maturity is attained in three to four days. The metacercariae were cultured in various aseptic media. In serum, embryo extract, glucose and Hank's saline the genitalia failed to develop. In cultures to which duck egg yolk had been added a few active spermatozoa were produced but no further development took place. The nature of the stimulus which initiates maturation is discussed. R.T.L.

(175c) The weight of blood required to initiate development of the ovaries in *Chrysops silacea* is not influenced by the ingestion of *Loa loa* microfilariae. The development of the ovaries in those flies interrupted after partial blood meals does not influence the proportion of microfilariae which normally develop but the opportunities of transmitting the parasite are increased. R.T.L.

(175d) The essential data required for a filariasis survey are: an estimate of the intensity and extent of filariasis in the vertebrate and invertebrate hosts, the effect of parasitism on the vertebrate hosts and invertebrate vectors and information on the reservoir hosts and the invertebrate vectors concerned. R.T.L.

(175e) Molluscs in tropical fresh waters favour those microhabitats with a higher oxygen tension. Where, in the same area, molluscan species have different microhabitats the sampling techniques may have to be adjusted to each species. R.T.L.

(175f) From a study of the distribution of *Trichina* larvae in two fatal cases which occurred during an outbreak of trichinosis in Liverpool in 1953 it was found that in the case with a light infection the number of larvae was highest in the muscles of the forearm and calf, while in the other case, in which the infection was heavy, the number in the tongue and diaphragm was as high as in the forearm and calf. Larvae were not found in the central nervous system of either case. R.T.L.

(175h) Crisp defines those areas in the Gold Coast where *Simulium damnosum* is now known to occur and the factors influencing its biting habits and its distribution in relation to altitude, climate, geological formation, vegetation density, chemical and physical characters of the waters in which the fly breeds, and the relation of its distribution to the incidence of *Onchocerca volvulus*. The only established factor influencing the fly's distribution is the speed of the currents in the streams. R.T.L.

176—Antibiotic Medicine and Clinical Therapy. Washington.

- a. SHETH, U. K., KEKRE, M. S. & LEWIS, R. A., 1956.—“Treatment of ancylostomiasis with Win 5047.” 3 (3), 197-198.

(176a) In 22 out of 26 cases of ancylostomiasis treated, thrice daily for three days, with 750 mg. of Win 5047 [N-(2,4-dichlorobenzyl)-N-(2-hydroxyethyl) dichloroacetamide] the hookworm ova disappeared from the faeces. Two of the cases which remained positive received a second course which resulted in a reduction in the number of ova in one and their disappearance in the other. The drug was well tolerated even where there was severe anaemia. R.T.L.

177—Archivio Italiano di Scienze Mediche Tropicali e di Parassitologia.

- a. CONGIU, M. & PIRLO, F., 1956.—“Variazioni elettroforetiche delle sieroproteine nell'idatidosi.” 37 (8), 428-433. [English, French & German summaries pp. 432-433.]

(177a) The electrophoretic pattern of serum proteins in uncomplicated hydatid of the lung and liver showed a remarkable hypoproteinaemia with gammaglobulinaemia in cases of liver infections while in those with lung invasion the pattern although constant was less pronounced. [Based on authors' abstract.] R.T.L.

178—Australian Journal of Zoology.

- a. BREMNER, K. C., 1956.—“The parasitic life-cycle of *Haemonchus placei* (Place) Ransom (Nematoda: Trichostrongylidae).” 4 (2), 146-151.
b. DURIE, P. H., 1956.—“The paramphistomes (Trematoda) of Australian ruminants. III. The life-history of *Calicophoron calicophorum* (Fischöeder) Nasmak.” 4 (2), 152-157.

(178a) Calves were infected experimentally with *Haemonchus placei*, the so-called bovine strain of *H. contortus*, and the morphology of the various parasitic larval stages were compared with those of *Haemonchus contortus* of sheep and goats. No morphological differences were observed. The third ecdysis occurred after 36 to 76 hours and the fourth ecdysis after 11 to 14 days. The duration of the fourth stage was slightly longer and the prepatent period was about 11 days longer than that in *H. contortus*. Eggs of *H. placei* did not usually appear in the faeces until 26 to 28 days after infection. R.T.L.

(178b) Specimens of the planorbid *Pygmanisus pelorius* from semi-permanent water holes around Ipswich in Queensland are frequently infected with a small black amphistome cercaria which Iredale showed, in 1943, to be the cercaria of *Calicophoron calicophorum*. Encysted cercariae were fed to a lamb and eggs were found in the faeces about 80 to 95 days later. At autopsy adult *C. calicophorum* were found in the rumen. The eggs, averaging $115\mu \times 69\mu$, were somewhat smaller than those reported by Durie (1951). The redia, cercaria and metacercaria are figured and briefly described. R.T.L.

179—Australian and New Zealand Journal of Surgery.

- a. GOULSTON, E., 1956.—“Massive haemobilia from an hydatid cyst of the liver.” 25 (24), 302-303.

180—Bayerisches Landwirtschaftliches Jahrbuch.

- a. SIMON, L., 1956.—“Möglichkeiten der Bekämpfung von Kartoffelnematoden. Eine Literaturübersicht.” 33 (1), 96-110.

(180a) Simon reviews the literature on the control of *Heterodera rostochiensis* published with a few exceptions, since 1939. He mentions the work done under the headings biology of the nematode, biological control, control by cultural means, enemy plants, trap plants, manuring, resistant potato varieties and crop rotation. In a section on chemical control he deals with stimulating materials, nematicides and soil fumigants. In summarizing the efficiency of the various means of control he concludes that direct control is too expensive on a large scale but good results will be given by a combination of crop rotation, trap-crop, resistant potato varieties, stimulant material and soil fumigant. There is a list of 114 references.

M.T.I.

181—Berliner und Münchener Tierärztliche Wochenschrift.

- a. MOEGLE, H., & VERCRUYSE, R., 1956.—“Ein Fall von Dermatitis verminosa beim Hund durch freilebende Nematoden.” 69 (22/23), 459-462. [English summary p. 462.]
b. KÖTTER, H., 1956.—“Über Auftreten und Verbreitung von Geflügelkrankheiten im Raum Weser/Ems.” 69 (24), 485-490. [English summary p. 490.]

(181a) A red and hairless condition of the skin on the abdomen, chest and outer parts of the limbs, combined with localized nodules and pustules on a dog examined in Giessen was caused by third-stage larvae of *Pelodytes strongyloides*. The infection was cured by local treatment at one, two or three-day intervals with Anthrasol (colourless coal tar) spirit, Creolin liniment [a coal tar preparation] and/or “Fissan oil”, followed by applications for several days of “Fissan oil”. The larvae were cultured on serum agar plates and sterile horse manure inoculated with *Escherichia coli*. Moegle & Vercruysse give descriptions and measurements of the first, second, third and fourth-stage larvae, and larvae from the pustules [but not of the adults]. The female is definitely oviparous. Larvae were occasionally seen inside the females but these females were invariably found to be dead.

M.MCK.

(181b) From 1950 to 1955, 5,921 birds from the region of the Weser and the Ems in Germany were examined post mortem for the causes of death. Almost all were from medium or small sized farms not chiefly concerned with poultry-rearing. Worms (*Ascaridia*, *Heterakis*, *Capillaria*, *Davainea* and *Raillietina*) were found in 11.55% of 4,976 domestic fowl and 4.55% of 739 chicks. Kötter lists, as percentages of the chickens infected, the incidences of the combinations of their various parasites. Six of 32 turkeys had died from helminth infections, 44.4% of 68 geese had stomach worms, 6 of 19 pigeons had died from capillaria infections. *Syngamus* was found in a sheldrake.

M.MCK.

182—Bird Study.

- a. JENNINGS, A. R. & SOULSBY, E. J. L., 1956.—“Diseases in wild birds, third report.” 3 (4), 270-272.

(182a) During investigations into the cause of death in 77 wild birds, various helminths were found and these are tabulated under their hosts. In some instances the number of parasites present seemed compatible with health but a young gull *Larus ridibundus* contained many *Capillaria contorta*, *C. anatis* and *Cosmocephalus aduncus*. An immature pink-footed goose *Anser brachyrhynchus*, from the breeding grounds in Iceland, died from severe erosion of the gizzard caused by *Amidostomum anseris*. Infected wild geese may be important carriers of the disease to domestic geese.

R.T.L.

183—Boletín Chileno de Parasitología.

- a. TAGLE, I., RIVERA, G. & NEGhme, A., 1956.—“Ensayos de infección experimental de *Octodon degus degus*, Molina, con *Echinococcus granulosus*.” 11 (2), 33–34. [English summary p. 33.]
- b. TAGLE, I., 1956.—“Distomatosis hepática en el ganado.” 11 (2), 35–36. [English summary p. 35.]
- c. ATÍAS, A. & PESSE, N., 1956.—“Distomatosis hepática en la infancia.” 11 (2), 36–38. [English summary p. 36.]
- d. TAGLE, I. & RIVERA C., C., 1956.—“Noticias científicas breves.” 11 (2), 38.

(183a) Although no tapeworm cysts were found in 228 *Octodon degus degus*, a wild rodent of South America, hydatid cysts were present in five out of 14 specimens which had been given a mature proglottis of *Echinococcus granulosus* each, from stray dogs in Santiago. M.MCK.

(183b) Except in the Magallanes Province, *Fasciola hepatica* occurs in sheep and cattle all over Chile causing serious economic losses among young animals in the central region. The vector, *Limnaea viatrix* (= *Galba* (*Pectinidens*) *viatrix*), lives chiefly in clean water channels and currents. Tagle found up to 15 or 20 metacercariae per blade of grass on a road used by sheep on the banks of the Maule. M.MCK.

(183c) *Fasciola hepatica* eggs were found in two sisters in Chile, aged seven and nine, after several faecal examinations. Both were cured with daily doses of 2 cg. of emetine hydrochloride given for 15 days (a total of 2 cg. and 1.2 cg. per kg. body-weight, respectively), without toxic effects. M.MCK.

(183d) Tagle & Rivera have found a *Diphyllobothrium latum* in a fox (*Dusicyon culpeus*) captured in the Province of Coquimbo, Chile. R.T.L.

184—Boletín Médico del Hospital Infantil. Mexico.

- a. CAMACHO GAMBA, J., 1956.—“El uso de algunos vermífugos en la parasitosis.” 13 (1/2), 43–51. [English summary p. 51.]
- b. VALLEDOR, T., LEÓN, J., COSTALES, F., PÉREZ HURTADO, F. & SATANOWSKY, C., 1956.—“Eosinofilia crónica masiva. Primo-infestación por *Fasciola hepática* y larvas migradoras viscerales de ascárides en su etiología. Reporte de un caso adicional.” 13 (1/2), 123–133. [English summary pp. 131–132.]

(184a) Camacho Gamba, having had only partial success with various anthelmintics in the treatment of eight children in Colombia with mixed nematode infections, suggests that the parasites may have acquired a certain degree of resistance from the continuous administration of the drugs. M.MCK.

(184b) The light catarrhal symptoms, slight fever and massive diffused eosinophilia of the liver in a child of 22 months in Cuba were probably attributable to visceral larva migrans. The baby was accustomed to sleeping with a parasitized puppy. There was a temporary decrease in the eosinophilia after treatment with cortisone and potassium in conjunction with a low salt diet. An outbreak of chronic massive eosinophilia at Pinar del Río, Cuba, in 1948 is attributed to *Fasciola hepatica* infections. M.MCK.

185—Bollettino della Società Italiana di Biologia Sperimentale.

- a. RIZZOLI, C., 1956.—“Ricerche sulla composizione aminoacidica della cuticola di *Ascaris*.” 32 (6), 357–361.

(185a) Analysis of the cuticle of the ascaris of the horse by chromatography showed the presence of large amounts of proline and glutamic acid, considerable quantities of valine, leucine and arginine, a little hydroxyproline and also aspartic acid, cystine, alanine, glycine, traces of tyrosine, phenylalanine and perhaps serine and threonine. M.MCK.

186—Bombay Veterinary College Magazine.

- a. KATHURIA, J. B., RAO, S. R. & HIRENGAUDER, L. S., 1956.—“Some observations on the bionomics of *Indoplanorbis exustus* Desm. (Gastropoda).” Years 1954-56, 5, 36-39.
- b. BHATAVDEKAR, M. Y. & KRIPALU, M. G., 1956.—“A case of nasal schisto[so]miasis in a she-buffalo.” Years 1954-56, 5, 61-63.

(186a) *Indoplanorbis exustus* was easily bred and maintained in the laboratory for three to five months. It is an intermediate host of several trematodes of domesticated animals and in the Bombay State 5% to 10% of this mollusc are infected with furcocercous, distomatous and amphistome cercariae.

R.T.

(186b) Although in the Surat District of Gujrat nasal schistosomiasis is common in bullocks, it has not hitherto been found in buffaloes by the authors. The snoring completely disappeared after the case now reported received, every week, three subcutaneous injections of anthiomaline, viz., 20 c.c., 30 c.c. and 50 c.c. with a nasal wash of alum-copper sulphate lotion.

R.T.

187—British Journal of Ophthalmology.

- a. BOASE, A. J., 1956.—“*Coenurus* cyst of the eye.” 40 (3), 183-185.

(187a) The occurrence of *Coenurus cerebralis* in the human eye is reported for the first time. Boase reports two cases in natives of Uganda. In one the cyst was in the vitreous humour. The other lay beneath the bulbar conjunctiva.

R.T.

188—British Medical Journal.

- a. HILL, R. D., 1956.—“Mass therapy with piperazine adipate in the control of threadworm infestations.” Year 1956, 2 (5002), 1156-1159.
- b. HUCKER, A. G. & SCHOFIELD, F. D., 1956.—“Whipworm infections. Trial of food piperazine compounds.” Year 1956, 2 (5002), 1159-1160.
- c. WHITE, R. H. R., 1956.—“Piperazine adipate in threadworm infestations.” [Correspondence.] Year 1956, 2 (5005), 1369.
- d. SHAIKH, S. M., 1956.—“Preservation of parasite ova.” [Correspondence.] Year 1956, 2 (5008), 1545.

(188a) In the Shetland Isles which have a population of 866, there are 194 children of from one to fourteen years old. All the children were treated for seven days with piperazine adipate tablets at a daily dosage of 300 mg. per year of age up to a maximum of 1.8 gm. per day. The treatment was repeated for seven days after an interval of one week. Anal swabs were taken from a sample group of 50 children of whom 32 were positive for *Enterobius* before treatment and two weeks afterwards the 30 who completed the course were found to be free from infection. Six months later 20 had again become infected, but one month after a second course they were again negative. It is concluded that mass treatment is only effective if the parents, and especially the mothers, are treated at the same time as the children.

R.T.

(188b) The number of *Trichuris trichiura* ova in the faeces of 80 persons remained practically unchanged two weeks after piperazine adipate, citrate, phosphate and sebacate had each been administered in a dosage equivalent to about 500 mg. of piperazine hexahydrate, thrice daily, for seven days. No side effects were observed.

R.T.

(188c) Commenting on Hill's conclusion [see abstract No. 188a above] that by mass treatment with piperazine *Enterobius* infection could be eradicated from a community of children, White points out that more than half of those cleared of threadworms had become reinfected within six months and expresses the opinion that as very few children show symptoms and as the relapse rate is so high, mass treatment is futile and the cost to the National Health Service unjustified.

R.T.

(188d) When preserved in 3% formalin, helminth eggs do not last more than a month or two, but they retain their normal morphology for two years in a mixture of 1 oz. (28 gm.) of faeces and 10-15 oz. (283-426 gm.) of equal parts of glycerine and normal saline. R.T.L.

189—British Veterinary Journal.

- a. SINCLAIR, K. B., 1956.—“Black disease. A review.” 112 (5), 196-200.
- b. SARWAR, M. M. & RAUF, A., 1956.—“Incidence and bionomics of *Dictyocaulus filaria* in the Punjab-Pakistan.” 112 (5), 200-212.
- c. DUNN, D. R., 1956.—“Studies on the pig lungworm (*Metastrongylus* spp.). II. Experimental infection of pigs with *M. apri*.” 112 (8), 327-337.

(189a) Sinclair reviews the incidence, symptoms, post-mortem findings, bacteriology, differential diagnosis, pathogenesis and prophylaxis of black disease. Although the disease is due to *Clostridium oedematis* and Turner reproduced the disease in rabbits experimentally infected with *Cysticercus pisiformis*, its occurrence in sheep under natural conditions is always associated with the presence of *Fasciola hepatica*. R.T.L.

(189b) In the semi-arid alluvial plains of the Punjab Province of Pakistan the incidence of *Dictyocaulus filaria* in sheep is restricted to the winter months and is higher in the older animals. First-stage larvae which could withstand drying for at least ten days in February, did not survive for three hours in April. The optimum temperatures favourable to upward migration of the final stage larvae in culture jars ranged between 15° and 22°C. At 28°C.-30°C. prevalent from April to August in the Punjab, the larvae degenerated without undergoing development. In two experiments under room conditions the larvae reached the third stage in 18 days at 12°C. and in four days at 28°C.-32°C. Larvae cultivated at 15°C.-18°C. in a layer of water 4 cm. or 15 cm. in depth had still retained their two sheaths after 12 and 15 days, whereas all those in 1 cm. to 2 cm. of water had cast the outer sheath by the 7th and 8th day. The infective larvae in culture jars descended on exposure to sunlight and ascended on removal to the dark. Orloff's method of intratracheal injection with iodine only inactivated the worms in the bronchi. The number of larvae passed in the faeces returned to the pre-injection level after a temporary reduction. R.T.L.

(189c) After eight pigs were fed with *Eisenia foetida*, which were infected in the laboratory with *Metastrongylus apri*, eggs appeared in their faeces three to four weeks, reached a peak five to nine weeks after dosing and fell fairly steeply to a relatively constant daily level. The eosinophils in the blood rose to 10% to 15% in about two weeks and then fell to 2% to 6%. Cough was the only symptom noticed during life, but at autopsy there was verminous pneumonia associated with the liberation of large numbers of eggs into the lung parenchyma and in those killed nine weeks or more after dosing there were lesions identical with those seen in naturally infected pigs, i.e. bronchitis, emphysema, peribronchial lymphoid hyperplasia, muscular hypertrophy of the bronchioles, greyish nodules, mainly on the lower border and caudal end of the diaphragmatic lobes. Usually the pig can tolerate moderate lungworm infections without serious adverse effects, but severe clinical pneumonia and death are likely to occur under adverse conditions of weather, housing, or virus and bacterial infections. R.T.L.

190—Bulletin of the College of Arts and Sciences, Baghdad.

- a. WATSON, J. M., 1956.—“The schistosomes and their molluscan vectors in Iraq.” 1, 1-11.

(190a) Present knowledge of the schistosomes of Iraq and of their vectors and distribution is summarized. *Schistosoma haematobium* is common in man in the centre and south and is spread by *Bulinus contortus*. *S. turkestanicum* and *S. bovis* are very common in domesticated animals in the lower part of the Tigris and Euphrates valleys. The vector of the former is probably *B. contortus* although this has not yet been established experimentally and that

of the latter is *Limnaea lagotis*. Both *B. contortus* and *L. lagotis* are absent from the main rivers and their tributaries and are limited to marshes, swamps and irrigation channels. The absence of *B. contortus* from the north, except for isolated colonies at Tel Keif and Jaiyef and from the extreme south beyond the Khandaq canal in Basrah, is due to the salinity of the tidal water in the lower Shatt Al Arab. Characteristic eggs of *S. bovis* were found by Watson on one occasion in human urine. Early reports of *Schistosoma mansoni* in certain small foci in the south of Iraq are now known to be erroneous since no suitable vector is present in the Tigris-Euphrates valley. The only other schistosome recorded from Iraq is *Bilharziella* sp., probably *B. yokogawai*, found once by MacHattie in 1936 in *Anas crecca*; its vector is unknown. R.T.L.

191—Bulletin of Epizootic Diseases of Africa.

- a. GINSBERG, A., CAMERON, J., GODDARD, W. B. & GRIEVE, J. M., 1956.—“Bovine cysticercosis, with particular reference to East Africa.” 4 (1/2), 27-39. [Also in French pp. 103-114.]
- b. COYLE, T. J., 1956.—“Liver fluke in Uganda.” 4 (1/2), 47-55. [French summary p. 121.]
- c. LEE, R. P., 1956.—“Strategic medication against *Neoscaris vitulorum*.” 4 (1/2), 61-63. [Also in French pp. 127-129.]

(191a) As Kenya is becoming a meat exporting country the applicability of established inspection procedures for the diagnosis of bovine cysticerciasis was investigated. Cysts were detected, by the standard carcass incisions only, in 30.6% of the European and 29.4% of the African stock. In these infected European cattle a single cyst was found in 17.9%. The Meat Regulations of the Union of South Africa, with certain modifications, were adopted as a result of the examination of 42,500 European and 12,850 African-bred cattle. The additional cuts now suggested are Viljoen's incision of the adductor muscle of the hind limb, three deep transverse incisions into the shoulder muscles and one extensive cut into the fleshy part of the diaphragm. R.T.L.

(191b) In Uganda fascioliasis is extremely common and the sudden deaths which are common in sheep are due to mass invasion of the liver by young *Fasciola*. Liver-fluke probably contributes considerably to the large number of livers condemned for all causes at the Kampala abattoir. The chief intermediate host is probably *Limnaea natalensis*. As a rule these snails do not occur in papyrus swamps but in grass swamps, e.g. in Teso district, they are abundant. In some Teso areas 100% of the cattle were found to be infected with liver-fluke. The provision of dams would prove of great benefit to stock owners provided stock was not allowed to enter them. R.T.L.

(191c) Lee gives an account of his success in controlling *Neoscaris vitulorum* in calves by prophylactic administration of a single dose of piperazine adipate at the rate of 100 mg per lb. body-weight when the calf is exactly 21 days old. R.T.L.

192—Bulletin de l'Institut Français d'Afrique Noire. Série A: Sciences Naturelles

- a. CAMPANA-ROUGET, Y., 1956.—“Parasites de poissons de mer ouest-africains récoltés par J. Cadenat. VI et VII. Nématodes (2e et 3e notes). VI: Parasites de sélaciens (1er complément). VII: Parasites d'apodes.” 18 (2), 459-466.
- b. GOLVAN, Y. J., 1956.—“Parasites de poissons de mer ouest-africains récoltés par J. Cadenat. VIII. Acanthocéphales.” 18 (2), 467-481.

(192a) Since recording *Terranova galeocerdonis* (Thwaite, 1927) in *Sphyrna zygaena* Campana-Rouget has identified this species in *Galeocерdo arcticus* and *Sphyrna diplana*. Thwaite had given the number of post-anal papillae as eight pairs, but two or three pairs of these are really ad-anals thus reducing the post-anals to six pairs, of which the first is voluminous and double. This number is probably constant throughout the genus. As the number of denticulations on the buccal capsule previously given as four to six may sometimes be eight or

ten this feature is less specific than originally suggested. The principal characters of *Parascarophis sphyrnae* (Campana-Rouget, 1955) from *Sphyrna diplana* on the coast of Senegal are summarized. The genus differs from *Ascarophis* chiefly by its cephalic cowl, two teeth on each pseudo-lip, the anterior position of the vulva and the small size of the eggs. R.T.L.

(192b) Although the acanthocephalan *Serrasentis socialis* is cosmopolitan it is particularly abundant in the Dakar-Gorée Atlantic area and is now recorded from eleven new piscine hosts as immature forms. The mature worms are described from *Rachicentron canadum*. Five other acanthocephalans from this area are described with their hosts, viz., *Gorgorhynchus robertdolfusi*, *Illiosentis furcatus* var. *africana*, *Rhadinorhynchus pristis*, *Acanthocephaloides chabanaudi* and *A. propinquus* which is now recorded outside the Mediterranean for the first time. R.T.L.

193—Bulletin of the Maryland Agricultural Experiment Station.

- a. GOLDEN, A. M., 1956.—“Taxonomy of the spiral nematodes (*Rotylenchus* and *Helicotylenchus*), and the developmental stages and host-parasite relationships of *R. buxophilus*, n.sp., attacking boxwood.” No. A-85, 28 pp.

(193a) The literature regarding the taxonomy of the spiral nematodes is reviewed as histories of (i) *Rotylenchus*, (ii) *R. erythrinae*, (iii) *R. multicinctus*, (iv) *Helicotylenchus*. The relationships of *Helicotylenchus* and *Rotylenchus* are discussed: in *Helicotylenchus* the dorsal oesophageal gland opens about one-half of a stylet length from the base of the stylet but in *Rotylenchus* the distance is one-third or less. In addition the phasmids in *Helicotylenchus* are of the small type only but in *Rotylenchus* both small and large types are found. The diagnosis of *Helicotylenchus* Steiner, 1945 is emended accordingly. Two new combinations are made, viz., *Helicotylenchus erythrinae* (Zimmermann, 1904) and *H. multicinctus* (Cobb, 1893) and a key to the identification of the spiral nematodes is provided. *Rotylenchus buxophilus* n.sp. is described and figured. It is characterized by the long stylet, the small-type phasmids placed pre-anally and the shape of the tail. Details of experiments on the host-parasite relationships of *R. buxophilus* on boxwood are given illustrated by figures and tables. J.B.G.

194—Bulletin Médical. Paris.

- a. LAGRAULET, J., 1956.—“L'onchocercose et ses manifestations oculaires.” 70 (1), 19-29.

(194a) Lagraulet summarizes the geographical distribution, epidemiology, clinical manifestations, prophylaxis and treatment of onchocerciasis and describes in detail the changes observable in the eye. In sections of the eye of a diseased African he noted geodes [dilated lymph spaces] of different sizes over most of the retina and clumps of pigment in all the layers of the choroid, occasionally invading the sclera up to half its thickness. M.MCK.

195—Bulletin du Muséum National d'Histoire Naturelle. Paris.

- a. BLANC, M., 1956.—“A propos de la lutte contre l'onchocercose en Afrique Noire.” 2e Série, 28 (3), 303-306.

(195a) Blanc has confirmed, by experiments at a fish culture station in the Upper Volta, that D.D.T. at a concentration of 8 mg. per litre for nearly two hours is well tolerated by fish; a concentration of 4 mg. per litre for 30 minutes was sufficient to kill simuliid larvae. The water courses in that area can be classified into two groups, those which even in the dry season have an unbroken stream and in which simuliid larvae occur all the year round and those which in the dry season dry up to a series of stagnant marshes and in which no simuliid larvae are found at that time of year. Control of the simuliid vectors of onchocerciasis with D.D.T. should be possible without destroying the fish fauna. S.W.

196—Bulletin de l'Office International des Épizooties.

- a. TRAWINSKI, A., 1956.—“La lutte contre la trichinose.” 46, 275-282. [English summary p. 282.]
- b. SCHÖNBERG, F., 1956.—“La lutte contre la trichinose.” 46, 283-290.
- c. ALVES DA CRUZ, A., 1956.—“La lutte contre la trichinose. La trichinose au Portugal.” 46, 291-297.
- d. AASER, C. S., 1956.—“La lutte contre la trichinose.” 46, 300-306. [English summary p. 306.]
- e. ANON., 1956.—“Resolutions adopted at the XXIVth Congress of the International Office of Epizootics (14th to 19th May, 1956).” 46, 850-855. [Also in French pp. 844-849.]

(196a) Trawinski reviews the published incidences of *Trichinella spiralis* in man and animals and the various methods of diagnosis. He summarizes the chief clinical symptoms of trichinosis, and the prophylactic measures followed in Poland. R.T.L.

(196b) Schönberg reviews the position of trichinosis in Germany where the latest outbreak was due to pork imported from Poland. For diagnosis he stresses the superiority of microscopes with dark ground illumination and trichinoscopes with shutters over the ordinary types. The incidence of infection in pigs in Germany between 1875 and 1885 was 0.61-0.48%, in 1904 0.06% and in 1928 0.0013%. In the Federal German Republic only 37 out of 14,315,278 pigs examined in 1954 were found to be infected. He contrasts this incidence with that in other countries and especially in the U.S.A. R.T.L.

(196c) Alves da Cruz recalls the various outbreaks of trichinosis in Portugal which have occurred since 1867. The serious epidemic of 1881 was attributed to infected pigs imported from Spain. Only a few cases have been reported since. Of the 1,645,919 pigs slaughtered in Lisbon between 1900 and 1954, 30 were seized and 22 of these came from Spain. No infection has been detected in the several hundred rats examined. R.T.L.

(196d) Owing to the prevalence of trichinosis in fur-bearing animals in Norway, owners are required to have their stock examined and to report to a veterinary surgeon any animals affected with trichinosis. Movement from the premises of pigs, dogs, cats or other fur animals without a permit from the Board of Veterinary Science is then prohibited. The wild fox plays an important role in the spread of trichinosis. Compulsory inspection of slaughtered pigs and carcasses of fur animals, the burning of carcasses of fur animals and other waste matter and the extermination of rats have been followed for several years with good results. R.T.L.

(196e) The twenty-fourth Congress of the International Office of Epizootics in 1956 recommended the systematic and compulsory examination of meat and meat products of pigs and all other animals which may be hosts of *Trichinella spiralis* and used for consumption; that meat infected with trichinae must, in principle, be destroyed but in those countries where trichinosis is very prevalent, and this would entail considerable economic losses, sterilization by heat or freezing may be applied on the advice of the veterinary authorities. It also recommended that echinococcosis be included in sanitary legislation and that (i) its occurrence in man be compulsorily notifiable, (ii) cases of hydatid in animals, in public and private slaughterhouses, be recorded and statistics be kept to enable the centres of infection to be traced, (iii) all slaughterhouses and private abattoirs be under veterinary supervision and slaughtering elsewhere be prohibited, (iv) infested organs be seized and sterilized before industrial recovery or burnt or buried in quicklime, (v) there should be a census of dogs and all dogs in parasite-infected areas should be disinfested. Monthly treatment with arecoline hydrobromide is effective and, in all cases, their excrement should be destroyed, (vi) research should be continued on (a) the life-cycle of the parasite, (b) the various hydatidomas in slaughtered animals, (c) the role of domestic and wild Carnivora as disseminators, (d) the relation between human and dog infestations, (e) new, cheap and easily applicable taeniocides and adjuvant substances to attenuate the toxicity of taeniocides now in use. R.T.L.

197—Bulletin. Rhode Island Agricultural Experiment Station.

- a. TARJAN, A. C. & CHEO, P. C., 1956.—“Nematocidal value of some fatty acids.” No. 332, 41 pp.

(197a) Fatty acids in the intermediate carbon numbered group were found to possess high nematocidal properties. Heptanoic, caprylic, pelargonic, capric and undecanoic acids were toxic to *Panagrellus redivivus* within a few minutes when this species was tested *in vitro* at concentrations of 1,000 p.p.m. A 2% aqueous undecylenic acid emulsion completely suppressed larval emergence from cysts of *Heterodera tabacum*. With the exception of undecylenic acid, the intermediate carbon numbered fatty acids gave complete control when applied as a spray to cyst infested surfaces. A 2% pelargonic acid emulsion spray gave good control of cyst infested burlap bags. When lily bulbs infected with *Pratylenchus penetrans* were immersed for one hour in 1% heptanoic and caprylic acids, a significant reduction in nematode numbers was obtained when compared with controls, six months after treatment. Various fatty acids were found to be anthelmintics when administered orally to chickens infected with *Ascaridia galli* and *Heterakis gallinae*. H.R.W.

198—Bulletin de la Société Neuchâteloise des Sciences Naturelles.

- a. DUBOIS, G. & FAIN, A., 1956.—“Contribution à l'étude des Strigeida du Congo Belge. I.” 79, 17-38.
b. EUZET, L., 1956.—“Une espèce nouvelle d'*Echeneibothrium* van Ben. 1850.” 79, 39-41.

(198a) From birds captured at Astrida in the Ruanda Urundi territory, Dubois & Fain have identified ten strigeids and add the following new forms: (i) *Strigea gracilicollis* n.sp. from *Buteo rufofuscus* is readily distinguished from *S. elongata* by the greater development of the copulatory bursa and genital cone, and by its more slender shape. (ii) *Parastrigea thienponti* n.sp. from *Ibis ibis* has a lobed ovary. It differs from *P. faini* and *P. astridae* by the extension of the vitelline glands to the posterior end of the body. It should not be confused with two American species *P. campanula* and *P. ogchnocephala* which have a pharynx. (iii) *Apatemon truonis* n.sp. from *Phalacrocorax africanus* resembles the Indian *A. pandubi* but there is a greater extension backwards of the vitelline glands and the position of the testes. (iv) *A. gracilis* var. *congolensis* n.var. from *Thalassornis l. leuconotus* is characterized by the smallness of the feebly muscular pharynx, while the genital cone is much more developed. Dubois & Fain provisionally allocate the species of *Apatemon* without creating subgenera and give a key for the four known species. Text figures are also given for the new species described and for *Parastrigea faini*, *Neodiplostomum* (N.) *spathoides*, N. (*Conodiplostomum*) *butasturinum*, *Tylodelphys clavata* and *Prohemistomum miloi* var. *indianum*. R.T.L.

(198b) After a re-examination of the type material of the cestode described from *Raja erinacea* by Linton (1889) as *Echeneibothrium variabile* van Beneden, 1850, it is now identified as *E. vernetiae* n.sp. as it differs from other species of the genus by its length (100 mm.), the number of loculi (eight) in the bothridia and the number of testes (40-50). R.T.L.

199—Bulletin de la Société de Pathologie Exotique.

- a. LAVIER, G., LAGRAULET, J. & D'HAUSSY, R., 1956.—“Étude anatomo-pathologique d'un oeil présentant une chorio-rétinite onchocerquienne.” 49 (3), 434-438.
b. PIGANOL, G., HERVE, A. & POURPRE, 1956.—“Complications cérébrales de la bilharziose à *Schistosoma mansoni*.” 49 (3), 450-455.
c. BIJAN, H. & DESCHIENS, R., 1956.—“Action des sels de baryum sur les mollusques vecteurs des bilharzioses.” 49 (3), 455-458.
d. PIGANOL, G. & HERVE, A., 1956.—“L'épreuve de cristallurie provoquée chez les bilharziens.” 49 (3), 458-462.
e. COUTELEN, F., BIGUET, J., CAPRON, A., DEBLOCK, S. & LANGINIEUX, J., 1956.—“L'oxyurose dans le nord de la France chez des adultes de plus de soixante ans.” 49 (3), 464-467.
f. CHABAUD, A. G. & ROUSSELOT, R., 1956.—“Un nouveau spiruride parasite du gorille *Chitwoodspirura wehri* n.g., n.sp.” 49 (3), 467-472.

- g. LAVIER, G. & DESCHIENS, R., 1956.—"Les distomatoses hépatiques en France, leur traitement." 49 (3), 541-553.
- h. CAVIER, R., 1956.—"Les propriétés anthelminthiques de quelques esters de l'acide cinnamique et de dérivés voisins." 49 (4), 631-636.
- i. CAVIER, R. & DEBELMAS, A. M., 1956.—"Étude expérimentale du pouvoir anthelminthique de certains aldéhydes aromatiques." 49 (4), 637-640.
- j. PARODI, PROUST & TALARMIN, 1956.—"Action des désoxybenzoïnes (1183 TH) sur la bilharziose intestinale." 49 (4), 654-657.
- k. DESCHIENS, R. & BIJAN, H., 1956.—"Comportement d'élevages de mollusques vecteurs des bilharzioses à l'obscurité." 49 (4), 658-661.
- l. COUTELEN, F., BIGUET, J., COCHET, G., DEBLOCK, S. & CAPRON, A., 1956.—"Quelques considérations sur la réceptivité à l'oxyurose. A propos de l'observation continue de quatorze enfants, poursuivie pendant sept mois à l'aide de la méthode de Graham." 49 (4), 724-734.

(199a) The authors describe and illustrate with photomicrographs the histopathology of an eye removed from a man suffering from onchocerciasis and who had been totally blind for two years. Of particular interest are the facts that they found no microfilariae and that vascular lesions predominated. This tends to support the view that the ocular lesions in onchocerciasis are of toxic origin. S.W.

(199b) Piganiol *et al.* describe a case of schistosomiasis *mansoni* in which the most serious consequences were grave neurological manifestations. Eggs of *Schistosoma mansoni* were not demonstrable in the faeces until three months after the onset of the illness. They discuss other cases of cerebral schistosomiasis which have been reported in the literature, most of which have been caused by *S. japonicum*. In another case in which there was inflammation of the optic nerve affecting the field of vision the commencement of these symptoms coincided with the probable time of infection with *S. mansoni*, although other parasites were present and there was also vesical schistosomiasis. S.W.

(199c) Bijan & Deschiens have tested the toxicity of barium salts to *Bulinus contortus* and *Planorbis glabratus*. Barium chloride killed *B. contortus* at a concentration of 1:70,000 and *P. glabratus* at 1:90,000. Barium nitrate killed *B. contortus* at 1:50,000 and *P. glabratus* at 1:50,000. *Carassius auratus* tolerated higher concentrations, the lethal concentration of the chloride being 1:5,000; the same concentration of the nitrate did not kill the fish. Water plants (*Elodea canadensis*) were more susceptible being killed in 15 days by either salt at a concentration of 1:100,000. S.W.

(199f) Chabaud & Rousselot describe and figure *Chitwoodspirura wehri* n.g., n.sp. from a gorilla originating from the Middle Congo. The new genus belongs in the Habronematinae and morphologically resembles *Odontospirura* but lacks lateral alae, has a dorso-ventrally elongated mouth surrounded by two labia and two pseudo-labia and spicules which are very unequal in size. The deirids lie in front of the nerve ring and both the protorhabdion and gubernaculum are well developed. The teeth on the pseudo-labia are very strongly developed. S.W.

(199g) Lavier & Deschiens describe the symptomatology and clinical picture of fascioliasis in man and discuss the diagnosis, prognosis, treatment and prophylaxis. In France eight outbreaks in families were described between 1942 and 1955. The disease almost always occurs south of the Loire. Specific treatment has yet to be found but emetine hydrochloride given intra-muscularly at a dose rate of 4 cg. to 8 cg. per day for eight to ten consecutive days has proved effective. Prophylaxis lies simply in avoiding eating wild water-cress or cress of which the origin is suspect. S.W.

(199h) Cavier tested a number of cinnamic acid esters and derivatives against *Rhabditis macrocerca* in vitro and found that *n*-butyl cinnamate had considerable anthelmintic properties. This substance was then given to mice infected with *Aspiculuris tetraptera* and it was found that a dose of 100 mg. per kg. body-weight daily for six days completely eliminated the parasites;

the average lethal dose for mice was shown to be about 7 gm. per kg. and 0.75 gm. per kg. daily for 15 days produced no lesions in the digestive tract. In clinical tests even young children tolerated the drug well and of 38 cases of enterobiasis in children between two-and-a-half and 16 years of age 32 were cured by a single course. The dosage recommended is 0.1 gm. per kg. per day for three consecutive days. Each daily dose is divided into two, one being taken in the morning before food and the other before the evening meal; half of each is given orally and the other half in the form of a suppository. S.W.

(199i) Cavier & Debelmas have tested a series of aromatic aldehydes for anthelmintic activity against *Rhabditis macrocerca* in vitro and *Syphacia obvelata* and *Aspicularis tetraptera* in mice. The substances were used in the form of an aqueous emulsion at a concentration of 10^{-2} M. Cinnamic aldehyde showed remarkable anthelmintic properties and was innocuous. Salicylic aldehyde was almost as efficacious as an anthelmintic but was far more toxic to the host. S.W.

(199j) Parodi *et al.* have tested 1183 TH on 18 cases of schistosomiasis mansoni. All the patients had contracted the disease two years or more previously. The drug was given in tablet form; six to ten tablets were given daily, the usual course being for eight days. At least two courses were necessary and often a third fifteen days later. Fifteen of the cases were cured and remained free from infection three months later. The treatment was perfectly well tolerated. Details of the clinical symptoms, dosage and results in each of the cases are shown in a table. S.W.

(199k) Deschiens & Bijan have shown that a population of *Planorbis glabratus* kept in the dark for 90 days maintains its normal behaviour and activity, there is no falling off of oviposition and the eggs hatch and the young snails develop normally. *Bulinus contortus* is less well adapted and populations kept in the dark were reduced by about 40%, egg laying is rare and the eggs frequently do not develop. S.W.

(199l) In this paper Coutelen *et al.* review published work on racial and age differences in susceptibility to enterobiasis and describe their observations on 14 children. These lived in a communal centre where the infection rate had previously been shown to be 91.31%; some were ineducable and the others were less mentally defective and lived in a separate building where the hygiene was strikingly better. The observations were continued during seven months and the authors conclude from them that there is notable variation in susceptibility between individuals and that this may be attributable to a certain amount of natural immunity. S.W.

200—Bulletin de la Société Zoologique de France.

- a. CHABAUD, A. G., 1956.—"Redescription du nématode *Physalopteriata citilli* (Rud. 1819) et remarques sur les physaloptères parasites de rongeurs." 81 (1), 52-62.
- b. GOLVAN, Y. J., 1956.—"Acanthocéphales d'oiseaux. Quatrième note. Considérations sur le genre *Pseudoporrorchis* Ch. Joyeux et J. G. Baer 1935 (Polymorphidae, Porrorchinae) et redescription de *Pseudoporrorchis centropi* (A. Porta 1910)." 81 (1), 62-71.

(200a) *Spiroptera citilli*, which was briefly described from one, probably immature, female by Rudolphi in 1819 and transferred by Hall in 1916 to *Physaloptera*, has not been seen again until now. A male and a female from *Citellus citellus* in the south of Czechoslovakia are redescribed and figured and placed in the genus *Physalopteriata* as *P. citilli* (Rud.) n. comb. *Pentadentoptera skrjabini* Schachnasarova, 1949 is also transferred to this genus as *Physalopteriata skrjabini* (Schachnasarova, 1949) n. comb. as *Pentadentoptera* is a synonym of *Physalopteriata*. R.T.L.

(200b) *Pseudoporrorchis centropi* (A. Porta, 1910) is redescribed and figured from *Centropus monachus* in Senegal. The genus now contains six species and the generic definition is revised. R.T.L.

201—C.S.I.R.O. Wildlife Research. Melbourne.

- a. MYKYTOWYCZ, R., 1956.—“A survey of endoparasites of the wild rabbit, *Oryctolagus cuniculus* (L.), in Australia.” 1 (1), 19–25.

(201a) Of 360 wild rabbits from 29 localities in Australia 89% contained helminth parasites, viz., *Trichostrongylus retortaeformis* (79%), *Passalurus ambiguus* (43%), *Graphidium strigosum* (33%), and *Cysticercus pisiformis* (19%). *Fasciola hepatica*, *Nematodirus spathiger* and *Nematodirus* sp.? were each found once and *Coenurus serialis* twice. *Fasciola hepatica* occurred in 7 out of 37 rabbits taken from a swampy paddock on the south coast of New South Wales. The regional distribution of the various species is tabulated. R.T.L.

202—California Agriculture.

- a. HANSEN, C. J., LOWNSEBURY, B. F. & HESSE, C. O., 1956.—“Nematode resistance in peaches.” 10 (9), 5, 11.

(202a) Peach seedlings of the varieties Shalil, Dwarf Hybrid No. 7, S-37, Lovell and 17 F₂ populations from a cross between Bokhara and a white flowering peach of the Snowball type were tested for their susceptibility to the root-knot nematodes *Meloidogyne incognita* var. *acrita* and *M. javanica*. Shalil and S-37 were very resistant to *M. incognita* var. *acrita* and Lovell was highly susceptible. The Dwarf Hybrid No. 7 and 8 of the F₂ populations segregated for resistance. The other 9 F₂ populations were uniformly resistant, as judged by root galling. Shalil seedlings grew to a height of 103.5 cm. while S-37 attained 71.9 cm., Dwarf Hybrid No. 7 66.6 cm. and Lovell 29.3 cm. All the seedlings exposed to *M. javanica* were galled but the average degree of infestation varied, being highest in Lovell and next, in descending order, in S-37, Shalil, Dwarf Hybrid No. 7 and the F₂ populations. The average heights of the plants reflected the degree of galling. It is suggested that by selection it may be possible to produce individuals highly resistant to *M. javanica*. M.T.F.

203—Canadian Journal of Comparative Medicine and Veterinary Science.

- a. CHOQUETTE, L. P. E., 1956.—“Significance of parasites in wildlife.” 20 (11), 418–426. [French summary pp. 424–425.]
b. LUBINSKY, G., 1956.—“On the probable presence of parasitic liver cirrhosis in Canada.” 20 (12), 457–465. [French summary p. 463.]

(203a) Choquette reviews the parasitic diseases of wild animals with reference to (i) the effect on and importance to the hosts themselves, (ii) the transmission of the parasites to domestic animals and (iii) the relationship to public health. He cites a number of helminths as examples including cysticerciasis in reindeer, larval tapeworm and roundworm infections of fish, *Fascioloides magna* in domestic ruminants, trichinellosis, hydatid disease etc. He also summarizes the evidence that parasites play a role in the oecology of wild populations. s.w.

(203b) Lubinsky reviews the published cases of infection of man by *Capillaria hepatica*. Thirty-four of these are tabulated as spurious as they were based on the passage of ova after the consumption of infected livers of rodents or other mammals. Sixteen reservoir hosts of *C. hepatica* in North and Central America are listed, including two new records from Canada, viz., the pocket gopher *Thomomys talpoides* and the deer mouse *Peromyscus maniculatus*; in both, the livers were sown with white nodules containing accumulations of ova. In northern Canada the aboriginal population occasionally ate these rodents and may therefore become infected. This may be one of the causes of the eosinophilia in some ethnic groups there. R.T.L.

204—Canadian Journal of Zoology.

- a. SCHAD, G. A., 1956.—“Studies on the genus *Kalicephalus* (Nematoda: Diaphanocephalidae). I. On the life histories of the North American species *K. parvus*, *K. agkistrodontis*, and *K. rectiphilus*.” 34 (5), 425-452.
- b. ANDERSON, R. C., 1956.—“The life cycle and seasonal transmission of *Ornithofilaria fallisensis* Anderson, a parasite of domestic and wild ducks.” 34 (5), 485-525.

(204a) Schad has studied experimentally the life-histories of *Kalicephalus parvus*, *K. agkistrodontis* and *K. rectiphilus*. No intermediate hosts are involved. Worm-free *Pituophis* spp., *Thamnophis sirtalis* and *Storeria dekayi* were used as hosts in the infection experiments. Eggs of all three nematodes could be cultured to the infective stage in tap-water but sand-charcoal-faeces cultures produced more numerous vigorous larvae. Detailed descriptions and drawings of eggs and larvae are given but no fourth-stage larvae of *K. parvus* were found. The eggs and free-living larvae of all three are essentially similar. The parasitic third-stage larvae of *K. parvus* and *K. rectiphilus* encyst, the former in the stomach, the latter in the intestine; those of *K. agkistrodontis* do not encyst. Eggs of *K. parvus* first appeared in the faeces of an experimentally infected gopher snake after 115 days, mature males of *K. rectiphilus* were found after 43 days and mature adults of *K. agkistrodontis* after 58 days. Both male and female genital rudiments show structural and developmental similarities to *Hyostrongylus rubidus* and the male rudiment in both *K. parvus* and *K. rectiphilus* undergoes a reversal. The spicular rudiment in *K. parvus* is described in detail and Schad found that at the parasitic third larval stage it was a single oval structure with a posterior extension. Although in the experiments oral infection was more successful than percutaneous, Schad speculates on the possibility of skin penetration being the normal route in nature. s.w.

(204b) Anderson found that white Pekin ducklings (*Anas boschas*) kept outdoors in the Algonquin Park, Ontario, during the springs and summers of 1952-55 became infected with *Ornithofilaria fallisensis*. *Simulium* (*Eusimulium*) *euryadmiculum*, *S. (E.) croxtoni*, *S. (E.) latipes* and *S. rugglesi* were found to feed naturally on ducks and ducklings, the three species of *Eusimulium* early in the season and *S. rugglesi* from about 26th May until the middle of July. Microfilariae developed to the infective stage in all these and also in *S. venustum* and *S. parnassum* but not in several species of mosquitoes or in *Culicoides* sp. Development to the infective stage in the vector takes 7-14 days, depending on the temperature, and the stages are described and illustrated; there are two moults and a “sausage stage”. The prepatent period in ducklings is 30-36 days and the microfilariae show diurnal periodicity. Re-exposure to infection was not successful indicating the development of acquired immunity. Some ducklings appeared to be naturally resistant to the infection. s.w.

205—Canadian Medical Association Journal.

- a. ROYER, A., 1956.—“Preliminary report on a new antioxyuritic, Poquil.” 74 (4), 297.

(205a) A cyanine dye, 6-dimethylamino-2-[2-(2,5-dimethyl-1-phenyl-3-pyrryl) vinyl]-1-methyl-quinolinium chloride dihydrate, with the proprietary name of Poquil is reported to be an effective anthelmintic for *Enterobius vermicularis*. When given in a dose of 1.5 mg. per kg. daily for eight days as an aqueous suspension no toxic effects were noted. R.T.L.

206—Central African Journal of Medicine.

- a. JACKSON, J. H., 1956.—“Bilharzia: the necessity for control measures on irrigated estates: the importance of a planned irrigation system in the biological control of the snail vectors in areas where the topography is suitable and site selection is possible.” 2 (4), 139-148.
- b. RITCHKEN, J. & SANDERS, E., 1956.—“Urinary bilharziasis: the results of treatment with anthiomaline administered intravenously in sixty-two cases.” 2 (7), 249-253.
- c. PAUL, R., 1956.—“Pulmonary schistosomiasis.” 2 (10), 355-360.

(206a) Jackson summarizes the theoretical and practical bases for the control of schistosomiasis in a sanitary minded community. On large irrigated estates permanent distribution

supplies in closed concrete pipes may prove a sound long term policy, and overhead spray irrigation could be used for certain crops. The gradient of all intake and distributing canals and channels should ensure a flow of, at least, 1.5 feet per second and should be deep rather than wide with adequate control lock gates. Where there is a fall or change of direction channels should be so constructed and cemented as to prevent scour holes and wash-outs. No permanent water should be allowed to stand on land when irrigation has ceased. Reservoirs and night storages should be constructed so that they and their intakes can be emptied and dried out once every four weeks. *Biomphalaria* spp. cannot tolerate even short exposures on sunbaked mud and high temperatures. Aquatic vegetation should be eliminated by weeding, by chemicals or by ducks and geese. Local residual snail lodgement sites should be checked periodically and molluscicides applied where necessary. Trees should not be planted near canal banks.

R.T.L.

(206b) After a course of intravenous injections of anthiomaline no *Schistosoma haematobium* eggs were found in the urine of 62 patients who had been examined three or more months after the completion of treatment.

R.T.L.

(206c) During an investigation of 300 African recruits, with *Schistosoma haematobium* eggs in the urine, from Northern Rhodesia, Nyasaland and Tanganyika, Paul could find no clinical or pathological abnormality in the lungs and none complained of symptoms relating to the chest. The infection with *S. haematobium* was always accompanied by albuminuria. Clinical and electrocardiographic studies revealed no case of cor pulmonale. No specific radiological changes were found in chest skiagrams and it would appear that, on the whole, there is no reason why recruits infected with schistosomiasis should not be admitted to the mining industry.

R.T.L.

207—Citrus Industry.

- a. SUIT, R. F. & BROOKS, T. L., 1956.—“Progress report on treating citrus trees in place to control burrowing nematode.” **37** (1), 5-6, 11.
- b. SUIT, R. F. & DuCHARME, E. P., 1956.—“Immunity of the lychee to the burrowing nematode.” **37** (1), 12-13.
- c. SUIT, R. F., DuCHARME, E. P. & BROOKS, T. L., 1956.—“Effectiveness of the pull and treat method for controlling the burrowing nematode on citrus.” **37** (2), 9-10, 23.
- d. DuCHARME, E. P., 1956.—“Sub-soil drainage as a factor in the spread of the burrowing nematode.” **37** (2), 20-21.

(207a) Citrus groves suffering from slow decline were injected with various nematicides in an attempt to control *Radopholus similis*. None of the nematicides tested had any lasting effects. Vapam (N-869) caused serious damage to roots. Nemagon (OS-1897) was promising for a time but roots in fumigated soil were reinfested within 18 months. The authors conclude that at present there is no substance that can be recommended for treating soil to control *R. similis*.

J.B.G.

(207b) Field and pot experiments indicate that the roots of the lychee, *Litchi chinensis*, are not attacked by *Radopholus similis*. It is clear that lychees could be planted to replace citrus in groves suffering from slow decline.

J.B.G.

(207c) Seven citrus groves suffering from slow decline were mapped for the disease. Four rows of trees beyond the decline area were pulled and burnt together with the trees in the area. The ground was then ploughed—the roots being collected and burnt—and injected with D-D mixture. Some areas were replanted with citrus within one year of treatment. Three years later the areas were sampled for *Radopholus similis* which was found in five out of six instances, though the marginal areas were only still infested in two cases. The measures recommended to control spreading decline are set out step by step and include a two year rest from citrus or other susceptible crops.

J.B.G.

(207d) Areas of slow decline in citrus groves were mapped in successive years and showed that on a hillside, for instance, the spread of *Radopholus similis* downhill was eight times the rate of that uphill through movement in drainage water. Drainage water from pots of infested citrus seedlings contained *R. similis* and when the nematodes were added to the top of a moist column of soil, 42 inches long and 3 inches in diameter, which was watered intermittently, live nematodes were recovered from the base of the column 30 hours later. *R. similis* lived for eight weeks in the soil column without food. *R. similis* moves about easily in the soils of Central Florida and its movement is influenced by the water present during and immediately following the rainy season. J.B.G.

208—Comptes Rendus des Séances de l'Académie d'Agriculture de France.

- a. GUILHON, J., 1956.—“L'influence de la nutrition sur le parasitisme des animaux domestiques.” 42 (6), 325-329.

(208a) Guilhon discusses the effect of the host's nutrition in parasitic diseases and the changes which take place before, during and after weaning. Adequate feeding will frequently ameliorate symptoms of disease caused by intestinal nematodes and lungworms in ruminants and trichonemiasis in horses; well fed animals are more resistant to infection. Mineral and vitamin deficiencies also play a large part in the development of disease. The results reported by a number of research workers are cited as examples. S.W.

209—Comptes Rendus des Séances de l'Académie des Sciences. Paris.

- a. TIMON-DAVID, J., 1956.—“Contribution à la connaissance du cycle évolutif des Dicrocoeliidae (Trematoda, Digenea): développement expérimental de *Brachylecithum alfortense* (Railliet) Dollfus, 1954.” 242 (10), 1374-1376.
- b. DOLLFUS, R. P., TIMON-DAVID, J. & REBECQ, J., 1956.—“Maturité génitale provoquée expérimentalement chez *Codonocephalus urniger* (Rudolphi) (Trematoda, Strigeidae).” 242 (25), 2997-2998.
- c. CHABAUD, A. G., 1956.—“Remarques sur les nématodes parasites du caecum des éléphants, milieu très préservé des phénomènes de sélection.” 243 (4), 436-439.
- d. GIROUD, P. & JADIN, J., 1956.—“L'importance du biotope est démontrée pour les poissons et leurs parasites par le comportement de captures faites dans un lac, à proximité d'un abattoir.” 243 (7), 686-688.
- e. ARVY, L. & GAILLARD, J. M., 1956.—“Castration parasitaire de *Pandora albida* (Roding), (*P. inaequivalvis* L.), mollusque pélecypode eulamellibranche, par *Cercaria melanocystea* n.sp., cercaire à grande queue vésiculeuse.” 243 (15), 1074-1077.

(209a) Timon-David has studied experimentally the first part of the life-cycle of *Brachylecithum alfortense*. *Helicella* (*Helicopsis*) *arenosa* were fed with eggs and 33 out of 42 became infected; 65 days later the livers of the snails were packed with innumerable sporocysts which Timon-David considered to be daughter sporocysts; 95 days after infection the outlines of the developing cercariae could be seen with the beginnings of the tail; after 180 days they were completely developed. The cercaria was provided with a tail as long as or longer than the body and the oral sucker was armed with a stylet; it belongs apparently to the *vitrina* group. Timon-David has not so far observed encystment or the formation of the metacercaria and considers that a second intermediate host is probably necessary. S.W.

(209b) The strigeid *Codonocephalus urniger*, often present in *Rana esculenta*, is not as has been frequently suggested a metacercaria. That it is an immature adult, in which the uterus is already differentiated but the ovary is not yet functional, has now been demonstrated experimentally. When the worms were transferred from their cysts to sterile Ringer's solution which was renewed every 12 hours and kept at 38°C. the yolk glands developed and, after 48 hours, eggs appeared in the uterus. R.T.L.

(209c) The caecum of elephants is an environment very well protected from the phenomena of selection. A study of *Quilonia* and *Murshidia*, two of the nematode genera which occur in this habitat, reveals three characteristics: (i) a great variety of species of the

same genus can exist in the same host; (ii) the evolution of the group can be followed quite precisely because forms intermediate between species are to be found; (iii) there is an abundance of teratological specimens with abnormalities most commonly in the form of the caudal bursa but also in the cephalic papillae and even the spicules. S.W.

(209e) *Cercaria melanocystea* n.sp. is described and figured from *Pandora albidia* near Dinard. Heavy infections caused the complete destruction of the host's gonad. The cercariae develop in sporocysts and have a large tail divided into two parts; the proximal part is transparent, bell-shaped and, like the body, covered with fine spines; the distal part is heavily pigmented, often tucked into the proximal part and, when the development of the cercaria is complete, is the equivalent of a cyst. There are two suckers, approximately equal in size but there is no stylet in the anterior sucker. The affinities of the new species with other cyst-forming cercariae are not clear. S.W.

210—Cornell Veterinarian.

- a. JONES, L. M., 1956.—“Pharmacological actions of some anthelmintics.” 46 (3), 382–396.

(210a) The primary considerations in the choice of an anthelmintic are that it should be effective and that its toxicity should be high for the parasite and low for the host. It should also be low in cost and easily administered. Where possible, one dose should suffice and the host should be in a good nutritional state. The metabolism, mechanism of action and toxicity of phenothiazine, toluene, the cadmium salts and piperazine and its derivatives are summarized. R.T.L.

211—Current Science. Bangalore.

- a. SINGH, K. S., 1956.—“Effect of temperature on development of miracidia of *Gigantocotyle explanatum* (Paramphistomatidae: Trematoda).” [Correspondence.] 25 (3), 93–94.
 b. JOHRI, G. N., 1956.—“A new cestode *Senga lucknowensis* from *Mastacembelus armatus* Lacep.” [Correspondence.] 25 (6), 193–195.
 c. REDDY, D. B., 1956.—“Nematode galls on a grass *Dicanthium annulatum*.” [Correspondence.] 25 (9), 303.

(211a) Refrigeration has no deleterious effect on the subsequent development of unembryonated eggs of *Gigantocotyle explanatum* which can be sent almost anywhere if packed in ice. The miracidia kept at 82°F. hatch in 11 to 12 days and in 9 days at 97–99°F. Unembryonated eggs can withstand 50°F. for 14 days. R.T.L.

(211b) *Senga lucknowensis* n.sp. from the Indian fresh-water fish, *Mastacembelus armatus*, can be distinguished from *S. pycnomerus* by the fewer hooks (36–48) on the bothria, the testes are numerous while the mature segments measure only 0.39 × 1.27 mm. It differs from *S. besnardi* by its larger hooks, bi-lobed ovary and the vitellaria which are interrupted along the middle of the segments. The hooks and testes are smaller than in *S. ophiophaliana* but the uterine sac is larger and the vitellaria are in groups in the cortical parenchyma. R.T.L.

(211c) Leaf galls on *Dicanthium annulatum* due to *Anguina* sp. are briefly described and figured. The galls are a few millimetres in diameter, pink to purple in colour and may cause twisting or shrivelling of the leaves. The dimensions of the eelworms are given. J.B.G.

212—Danish Medical Bulletin.

- a. RIIS, P., 1956.—“Two cases of schistosomiasis (bilharziasis) in Denmark.” 3 (1), 30–32.

(212a) Two cases of schistosomiasis haematobia, seen by Riis in Denmark, had returned recently from residence in Swaziland, South Africa where *Schistosoma haematobium* is endemic. R.T.L.

213—*Deutsche Tierärztliche Wochenschrift.*

- a. BOCH, J., 1956.—“Der Wurmbefall bei Schweinen verschiedenen Alters.” 63 (37/38), 381-384.
- b. THOM, K. L., 1956.—“*Fasciola hepatica* als Ursache einer Endometritis des Rindes.” 63 (37/38), 389-390.

(213a) Boch reviews our knowledge on the resistance of pigs to worm infections at different ages. He tabulates results of faecal examinations of 500 pigs for slaughter, 180 from small farms and 215 from large-scale breeders. These show that in general the pigs were infected with *Strongyloides* and *Ascaris lumbricoides* up to seven months of age, whereas the incidences of *Oesophagostomum dentatum*, *Globocephalus urosubulatus* and *Hyostrongylus rubidus* increased in the age range from two-and-a-half to 18 months. That of *Physocephalus sexalatus* was little affected by age. The long prepatent period of some nematodes makes it necessary to verify parasitological ailments in piglets by examining the sow. M.MCK.

(213b) *Fasciola hepatica* was detected in the uterus in five sterile cows in several parts of Styria [Austria]. Four presented a red or reddish-brown uterine secretion which in two cases contained fluke eggs. Mature flukes were recovered in two cows and at least one had endometritis associated with the infection. M.MCK.

214—*Documenta de Medicina Geographica et Tropica. Amsterdam.*

- a. HARTZ, P. H., 1956.—“Use of the phase-contrast method in parasitological examination of faeces.” 8 (2), 164-166. [Spanish summary p. 166.]

(214a) Hartz considers phase contrast to be of great value in routine faecal examination but does not agree that larger stands with built-in illumination are necessary; he recommends a small and easily transportable stand (the M-11), a powerful lamp with collector lens and iris diaphragm, and the use of a green filter. Thin smears of freshly passed stools should be used. The detailed structure of the ova of *Ascaris*, *Trichuris*, *Necator* etc. are exceptionally clear and the larvae of *Strongyloides stercoralis* easy to recognize. S.W.

215—*Dokladi Akademii Nauk SSSR.*

- a. KRASNOLOBOVA, T. A., 1956.—[On the development and biology of the trematode *Prosthogonimus cuneatus* Rudolphi, 1809, the causative factor of a disease of the chicken oviducts.] 106 (1), 165-168. [In Russian.]
- b. FEDYUSHIN, A. V., 1956.—[Experimental *Polymorphus* disease in the domestic hen.] 106 (2), 375-376. [In Russian.]
- c. KADENATSII, A. N., 1956.—[Setariasis in sheep: biology of the causal parasite.] 107 (1), 191-192. [In Russian.]
- d. DELYAMURE, S. L., 1956.—[The amphiboreal and bipolar distribution of helminths of marine mammals.] 107 (4), 621-623. [In Russian.]
- e. IVASHKIN, V. M., 1956.—[Elucidation of the life-cycle of the nematode, *Parabronema skrjabini* of ruminants.] 107 (5), 773-775. [In Russian.]
- f. MYUGE, S. G., 1956.—[A contribution to the study of the physiology of the nutrition of the gall nematode.] 108 (1), 164-165. [In Russian.]
- g. RIZHIKOV, K. M., GUBANOV, N. M. & FEDOROV, K. P., 1956.—[An interpretation of the biological cycle of *Protostrongylus* in *Lepus variabilis*.] 108 (1), 166-168. [In Russian.]
- h. CHIZHOVA, T. P., 1956.—[The spread of diphyllbothriasis in the Kalingrad area.] 108 (2), 370-371. [In Russian.]

(215a) The complete development of the operculate eggs of *Prosthogonimus cuneatus* up to the hatching of miracidia took eight to ten days at 28-34°C. The miracidium was 0.024 mm. with long cilia. Larval development in *Bithymia tentaculata* lasted 45 days at 25-27°C. Rediae were absent and the sporocysts contained three to four undeveloped cercariae. Mature cercariae were 0.15 mm. long with a 0.075 mm. tail and a 0.012 mm. stylet. Krasnolobova is of the opinion that they entered the larvae and imagines of *Libellula quadrimaculata* and *Cordulia aenea* passively. The metacercariae, 0.54 mm. long, were surrounded by six membranes, the outer having radial striations. Adult *P. cuneatus* developed in the bursa Fabricii of experimentally infected chickens in 16-17 days. G.I.P.

(215b) In Western Siberia and the Trans-Ural, *Gammarus lacustris* have been used to supplement chicken-feed. When chickens were fed for two months on *Gammarus*, 100% of which were infected with *Polymorphus minutus*, 88 died and 7 contained worms of about half their normal size and the females were without eggs. This might have resulted from insufficient food as the chickens had died of lack of gruel and green foods. G.I.P.

(215c) The peak of *Setaria marshalli* infections of sheep in the Soviet Far East occurred in August and September. Acute infections caused the death of 70-75% of infected sheep two to three weeks after the first appearance of symptoms. At post-mortem, *Setaria* were found in the cranium and brain. Under experimental conditions, the development of microsetariae to the infective stage in *Culex pipiens* and *Aedes*, involved two moults and lasted 32-33 days and the development of adults in lambs, calves and kids about 8-10 months. After experimental infection adult *Setaria* were found in calves in the abdominal cavity only, but in some of the lambs and kids also in the brain and cerebrospinal cavity. G.I.P.

(215d) The helminth fauna of marine mammals from the Pacific and Atlantic Oceans is compared. In the Pacific, 50% of the boreal species are endemic and there are two endemic subfamilies (Delphinicolinae and Nasitreminae) and nine genera, while in the Atlantic 34.3% of the northern species are endemic and there are only four endemic genera. The oceans have in common, however, 20 of the 113 species recorded from the boreal zones, as well as some genera. This similarity is not so marked in the tropical zones. Two genera and ten species of helminths recorded for both the southern and northern hemispheres exist in marine mammals, viz., *Priapocephalus* and *Crassicauda* and species of *Anisakis* and *Bolbosoma*. G.I.P.

(215e) *Parabronema skrjabini* eggs laid in the abomasum and passed with the faeces of ruminants are ovally elongated and measure 0.039-0.048 × 0.009-0.011 mm. Scarabaeid, tenebrionid and trogid beetles collected in the infected areas of Mongolia and West Kazakhstan, were free of infection, but infective larvae were found in *Lyperosia tuillans*. The larvae of these flies, bred experimentally, became infected by eating contaminated camel faeces. First-staged larvae were armed with a stylet. Encysted second-stage larvae were found in the pupa. These infective larvae were 1.78-1.85 mm. long with a rounded tail which lacked spines. Development in the fly lasted 15-17 days. In the final host, *P. skrjabini* lives for 15 to 19 months. G.I.P.

(215f) In a study of the reaction of plants, mainly cucumbers, to *Meloidogyne incognita*, Myuge found that the respiratory coefficient of healthy roots was 0.8, of firm galls 0.6 and of decaying galls 0.7; the absorption of oxygen per 1 gm. in one hour was 0.45, 1.53 and 0.51 and the pH 4.8 to 5.2, 6.8 to 7.0 and 7.2 to 8.0 respectively. Increasing alkalinity was due to accumulation of ammonia. The worms feed on simpler nitrogen compounds broken down from albumins under the action of nematode secretions. That gall growth is not influenced by auxins alone was demonstrated by the growth of bean roots. In the first 26 hours the growth of the roots in gall extract was strongly retarded, but by the second day the toxic effect changed to growth stimulation and after five days the roots in the gall extract had overtaken those in healthy root extract by 30% and those in water by 150%. It is suggested that amino-acids freed by the nematode may cause the gall formation. G.I.P.

(215g) In the Yakutsk Republic *Protostrongylus kamenskyi* and *P. terminalis* are simultaneously parasitic in the hare and their larvae could not be distinguished. Larvae, having shed their egg membrane and passing in the faeces, were 0.34-0.35 mm. long with a pointed tail lacking a dorsal spine. The oesophagus was 0.13-0.14 mm. Of the local land snails examined, 30% of *Vallonia tenuilabris* and 36% of *Pupilla muscorum* were infected. In the snail the larvae went through two moults and became infective in 30 to 35 days. Infective larvae, taken from within their two cuticular sheaths, were 0.5-0.64 mm. long. Two hares were given infected *V. tenuilabris* and 19 to 20 days later were passing eggs. On autopsy the lungs contained adult *P. kamenskyi* and *P. terminalis*. G.I.P.

(215h) In the Kalingrad area *Diphyllbothrium latum* is present among the local population. Plerocercoids were found in seven pike out of 156 fish belonging to six different species.
G.I.P.

16—East African Agricultural Journal.

- a. ANON., 1956.—“Notes on animal diseases. XXVIII. Some aspects of sheep management.” 22 (2), 64–69.
- b. WHITEHEAD, A. G., 1956.—“Plant-parasitic nematodes—important pathogens in tropical agriculture.” 22 (2), 92–96.

(216b) As several serious diseases of crops in East Africa are attributed to eelworm damage, Whitehead gives a general account of the nature of eelworm lesions in plants, the field symptoms and soil conditions favourable to eelworm increase and their various modes of spread and control.
R.T.L.

17—East African Medical Journal.

- a. JORDAN, P., 1956.—“Filariasis in the Eastern, Tanga and Northern Provinces of Tanganyika.” 33 (6), 225–233.
- b. JORDAN, P., 1956.—“Filariasis in the Western Province of Tanganyika.” 33 (6), 233–236.
- c. JORDAN, P., 1956.—“Filariasis in the Lake Province of Tanganyika.” 33 (6), 237–242.

(217a) The incidence of filariasis is high in the Pangoni and Kilombero Valleys and especially on the coastal areas of the Southern Province of Tanganyika. The rate in the lower reaches of the Rufiji River and a large area south of Dar-es-Salaam is much lower than to the north and farther south. The incidence in the foothills of the central plateau north-west of Bagamoyo District and at Panga in Handeni District is low, in Morogoro District further inland it is high. In the highland area of the Eastern and Tanga provinces it is low. There is less microfilaraemia among indigenous Asians than Africans as a result, probably, of the use of mosquito nets by the indigenous Asians. *Acanthocheilonema perstans* microfilariae were seldom found in the Eastern Province but *A. perstans* and *Wuchereria bancrofti* frequently occurred at Ilonga in the Mahenge District. *W. malayi* was not detected although *Mansonioides* sp. were present in the coastal area where immigrants from India and Pakistan had settled.
R.T.L.

(217b) From a survey of the Western Province of Tanganyika, Jordan concludes that filarial infection is of little importance there. The few cases of *Wuchereria bancrofti* infection seen were in places adjacent to the endemic foci in the Lake Province. Small isolated foci at Kigoma and Mabamba may have been acquired elsewhere. The few *Acanthocheilonema perstans* infections found were in villages to the north east of Kigoma. The indigenous cases of elephantiasis seen at Mabamba were probably not of filarial origin.
R.T.L.

(217c) The percentage rates of bancroftian microfilaraemia, and the incidence of hydrocele and of elephantiasis in 34 villages, including four small islands, are tabulated and indicate that *Wuchereria bancrofti* infection south and south-east of Lake Victoria is common. *Acanthocheilonema perstans* is prevalent to the west and south-west of the lake.
R.T.L.

218—Empire Journal of Experimental Agriculture.

- a. GIBSON, T. E., 1956.—“The hazards of parasitic gastro-enteritis in sheep running under conditions of intensive stocking.” 24 (96), 278–294.

(218a) That parasitic gastro-enteritis may become a serious hazard in sheep was demonstrated by the effects of grazing at the rate of five ewes per acre. Success or failure of intensive grazing may depend not only on management but also on the weather during the summer as wet weather leads to an increase in the number of infective larvae on the pastures. While routine anthelmintic dosing is essential, the maximum rate of stocking permissible must

depend on local conditions. An appendix gives tabulated data on egg counts and pastured larval counts on experimental grazing plots during two grazing seasons and the results of post mortem examinations of the sheep which died during the second season.

R.T.H.

219—Experimental Parasitology. New York.

- a. KRUPP, I. M., 1956.—“Amebic invasion of the liver of guinea pigs infected with the larvae of a nematode, *Toxocara canis*.” 5 (5), 421–426.
- b. VERNBERG, W. B. & HUNTER, W. S., 1956.—“Quantitative determinations of the glycogen content of *Gynaecotyla adunca* (Linton, 1905).” 5 (5), 441–448.
- c. BIRD, A. F. & ROGERS, W. P., 1956.—“Chemical composition of the cuticle of third stage nematode larvae.” 5 (5), 449–457.
- d. JENNINGS, F. W., MULLIGAN, W. & URQUHART, G. M., 1956.—“Radioisotope studies on the anemia produced by infection with *Fasciola hepatica*.” 5 (5), 458–468.
- e. DROPKIN, V. H. & KING, R. C., 1956.—“Studies on plant parasitic nematodes homogeneously labelled with radiophosphorus.” 5 (5), 469–480.
- f. SMYTH, J. D., 1956.—“Studies on tapeworm physiology. IX. A histochemical study of egg-shell formation in *Schistocephalus solidus* (Pseudophyllidae).” 5 (6), 519–540.
- g. HUNTER, JIL, G. W., RITCHIE, L. S., LIN, S., PAN, C. & TANABE, H., 1956.—“Immunological studies. I. Experiments with bird and human schistosomes in small mammals.” 5 (6), 551–559.
- h. KERR, K. B. & WALDE, A. W., 1956.—“The anthelmintic activity of tetravalent tin compounds.” 5 (6), 560–570.
- i. VOGEL, M. & TURNER, J. A., 1956.—“Effect of temperature on larval development of the cestode, *Hymenolepis diminuta*.” 5 (6), 580–586.
- j. BEAVER, P. C., 1956.—“Larva migrans.” 5 (6), 587–621.

(219a) Krupp infected 54 guinea-pigs with larvae of *Toxocara canis* at the rate of 2 larvae per gm. body-weight and, one to four weeks later, inoculated them with cultures of *Entamoeba histolytica*: 29 guinea-pigs which had not received *T. canis* were inoculated with *E. histolytica* as controls. Statistical analysis of the results indicated that there was only border-line significance in the relationship between the presence or absence of larvae in the liver and the proportion of animals from which amoebae could be recovered in cultures of liver tissues, but when amoebae were recovered from the liver a significantly higher proportion of the cultures were positive from livers with larvae than from those without. Microscopical examination of sections of the livers failed to show whether or no amoebae in the liver were associated with the tissue changes caused by the nematode larvae.

S.W.

(219b) Vernberg & Hunter have made quantitative glycogen determinations on adults of *Gynaecotyla adunca* maintained in standard sea water solution, in this solution plus 0.02M glucose and from experimentally infected birds. Determinations were made at 24-hour intervals for 96 hours. The glycogen content decreased with age in all three groups but most rapidly in those maintained in standard sea water and least rapidly in those in birds. In an addendum they draw attention to an erroneous identification of a metacercaria affecting the information contained in a previous paper which appeared in *Trans. Amer. micr. Soc.*, 1953, 72, 163–170. The cercaria described as that of *G. adunca* is that of *Zoogonus rubellus*. A cercaria, apparently identical with that of *G. nassicola* has been obtained from *Nassa obsoleta* and shown to be that of *G. adunca*. Results of studies of oxygen consumption and the developmental stages will be published shortly.

S.W.

(219c) Bird & Rogers have examined the cuticle of third-stage larvae of *Haemonchus contortus*, *Trichostrongylus* spp. and *Nippostrongylus muris* for lipids, carbohydrates and proteins. Exsheathment was obtained by immersing the larvae in 0.27% sodium hypochlorite. It is probable that this treatment and the subsequent washing led to the loss of some constituents. The cuticles were soluble in boiling water, 0.2N sodium hydroxide and 10% sodium hypochlorite. Pepsin and trypsin failed to hydrolyse the larval cuticle, suggesting that certain amino-acids were absent. Proline, hydroxyproline, aspartic acid, cysteic acid, glutamic acid, alanine, leucine, glycine, and valine were present. Small amounts of fructose were probably also present. Disulphide bonds and quinone tanning, of importance in the adult cuticle, could not be demonstrated in the larval cuticles.

S.W.

(219d) Jennings *et al.* have used red blood cells labelled with P^{32} and serum albumin labelled with I^{131} in a study of the anaemia associated with *Fasciola hepatica* infections in rabbits. With the labelled red cells the calculated blood loss was approximately 0.2 ml. per day per fluke; with labelled serum albumin about half this amount was lost. When red cells and albumin were used simultaneously it was found that the $P^{32}:I^{131}$ ratio in the flukes was consistently higher than the corresponding ratio in the blood. The amount of blood lost was sufficient to account for the anaemia produced. The authors discuss the use of radioisotope techniques in this type of work and consider that it would be of value in estimating the consumption of blood by hookworms and other blood-sucking parasites. s.w.

(219e) Tomato seedlings were grown in nutrient solutions containing radioactive phosphorus and inoculated with *Meloidogyne incognita* var. *acrita* and *Heterodera rostochiensis*. The quantity of phosphorus in the roots and in various stages of the nematodes was calculated. Galled roots accumulated phosphorus at a lower rate than uninfested roots of the same plant but there was less translocation of phosphorus out of galled tissue than out of healthy. In heavily galled tomato roots the nematodes may constitute 2% of the fresh root weight and contain 20% of the total phosphorus in the root and 10% of that in the whole plant. It is concluded that the unhealthy condition of the plant is not caused by the parasite depriving the plant of phosphorus. M.T.F.

(219f) Smyth describes and illustrates schematically the formation of the egg-shell in *Schistocephalus solidus*. Histochemical tests show that the vitelline cells contain large globules of shell precursor which react to the same tests as shell material for protein, phenols and polyphenol oxidase. The vitelline cells release these globules in the upper uterus where they coalesce and form a shaped egg-shell enclosing the ovum and the remains of the vitelline cells. The cells of Mehlis' gland give a strongly positive reaction with the periodic acid Schiff reaction but negative results with Millen and Sudan black and Smyth concludes that present histochemical techniques do not permit the nature of the secretion from Mehlis' gland to be determined. Although colourless when laid the eggs turn brown on exposure to air, give positive reactions for proteins and polyphenol oxidase and are weakly phenolic. This suggests that the shell belongs to the sclerotin group of structural proteins and is formed by a quinone-tanning process. The detailed results of the various histochemical tests are given in tabular form and the theoretical considerations discussed. s.w.

(219g) Using mice, hamsters and rabbits Hunter *et al.* have tested the effect of repeated exposures to *Gigantobilharzia sturniae* cercariae and to *Schistosoma japonicum* cercariae and of exposures to first one and then the other species. Repeated exposures to *G. sturniae* produced a marked increase in sensitivity but *S. japonicum* did not. When exposure to *S. japonicum* was preceded by *G. sturniae* there was no evidence of skin sensitization or of any resistance. When *G. sturniae* was preceded by *S. japonicum* there was less tissue reaction than when exposure to *G. sturniae* was repeated and fewer penetrating cercariae were visible in the sections of biopsies. s.w.

(219h) Kerr & Walde have tested a wide range of organic tetravalent tin compounds for anthelmintic activity against *Railletina cesticillus* and *Ascaridia galli* in chicks. Dibutyl tin dilaurate was used as the standard reference compound. The most consistent anthelmintic activity was shown by compounds of the type R_2SnX_2 and greater activity was found to occur when the moieties in the R and X positions were of relatively simple structure. In general the dose effective against *A. galli* was two-and-a-half times greater than that required for *R. cesticillus*. The chemicals were administered both in the food and as a single oral dose. Of fourteen compounds of the R_2SnX type tested three were among the most active tested: these compounds were more toxic than the others in general and were less active when administered in the food than when given as a single oral dose. s.w.

(219i) Voge & Turner have investigated the effect of temperature on the development of cysticercoids of *Hymenolepis diminuta* in *Tribolium confusum*. At 10°C. the beetles died before the cysticercoids had completed their development. At 15°C. mature cysticercoids were obtained after 65 days, at 20°C. in 23 days, at 22°C. in 19 days and at 25°C. in 14 days, in each case the cysticercoids appeared normal. At 30°C. mature and infective cysticercoids were obtained in eight days but there were several abnormalities, especially where the cysticercoids were overcrowded. No abnormal larvae were observed at 34°C. and development took place in six days. At 37°C. infective cysticercoids were obtained in five days but there were a number of abnormalities, the tail was often reduced or absent and the membranes were unusual in appearance. At 40°C. mature cysticercoids were never obtained. For laboratory work 30°C. appears to be the optimum temperature. S.W.

(219j) In this review of "larva migrans" caused by helminths, Beaver points out that one feature common to all the manifestations is that they do not lead to mature infection after a normal period of prepatency. They may be collectively referred to as "nonpatez nematodiasis" and include cutaneous larva migrans or creeping eruption, visceral larva migrans, larval gnathostomiasis and larval filariasis. Creeping eruption is of varied aetiology being caused by skin-penetrating nematode larvae, normally hookworms (of man and animal) and *Strongyloides*. Visceral larva migrans occurs largely in young children and is frequently caused by *Toxocara canis* and *T. cati* although *Toxascaris leonina* and *Capillaria hepatica* amongst other nematodes, have also been implicated. Gnathostomes and filarial worms belonging to the genus *Dirofilaria*, cause cutaneous and subcutaneous lesions in man which are indistinguishable. *Setaria digitata* larvae have been shown to cause a serious disease in horses, sheep and goats by invading the brain and spinal cord and it is not unlikely that a similar disease may occur in man. There is a bibliography of more than 130 titles. S.W.

220—Fukuoka Acta Medica.

- a. ABE, T. & KITSUKI, T., 1956.—[A case of abdominal paragonimiasis erroneously diagnosed as one of gastric cancer.] 47 (7), 959-962. [In Japanese: English summary p. 959.]
- b. OGIMOTO, S., 1956.—[Studies in the chemical composition of matter contained in worm cyst of the lung fluke *Paragonimus ohirai* Miyazaki, 1939.] 47 (7), 1077-1091. [In Japanese: English summary pp. 1077-1078.]
- c. ISHII, Y., 1956.—[Studies on the life history of *Gnathostoma doloresi* Tubangui, 1925 in Japan.] 47 (9), 1474-1494. [In Japanese: English summary pp. 1474-1476.]

(220b) Spectroscopical examination of the fluid contents of cysts of *Paragonimus ohirai* showed that the pigment was in the form of alkaline haematin similar in absorption spectrum to that obtained from rat blood. Crystals of a substance resembling haemin were also present in the cyst fluid, and were probably derived from haemoglobin by enzyme activity in the fluke's gut. Paper chromatography showed that the cyst fluid contained amino-acids similar to those in the host's blood and stearic acid. But Amin was not detected. Glucose was detectable in the body and in the cyst fluid. R.T.L.

(220c) Encysted third-stage larvae of *Gnathostoma doloresi* were found in 30 out of 342 *Hynobius naevius* and in one out of 28 *H. stejnegeri*. These salamanders were collected in the Miyazaki and Kumamoto Prefectures. The identity of the larvae was confirmed by the finding of adults and eggs in wild boars and hogs fed with these gnathostome larvae. Experiments showed that *Mesocyclops leuckarti*, *Eucyclops serrulatus*, *Cyclops vicinus* and *C. strenuus* can act as first intermediate hosts (the last two being new records) but attempts to transmit from the first to the second intermediate hosts failed. R.T.L.

221—Giornale di Malattie Infettive e Parassitarie.

- a. CANNAVÒ, L. & TIGANO, F., 1956.—"Clinica dell'anchilostomiasi." 8 (4), 125-132.

(221a) This is a general consideration of the clinical aspects of hookworm, with special reference to conditions in Italy. R.T.L.

22—Gunma Journal of Medical Sciences.

- a. HARA, K., 1956.—“Liver function in experimental ancylostomiasis.” 5 (3), 173–189.
- b. TAKAGI, K., 1956.—“Responses of adrenal cortex under the experimental parasitic invasion.” 5 (3), 190–208.

(222a) From a study of the liver of dogs infected with *Ancylostoma caninum*, Hara presents accurate evidence of the hepatic dysfunction in ancylostomiasis. The histological changes were mainly in the parenchyma cells which showed cloudy swelling, vacuolation of the protoplasm, central necrosis of the lobule and haemosiderosis of Kupffer cells. These changes were not always in proportion to the number of worms present. Cytochemical findings included a reduction of nucleic acids and glycogen content and mitochondrial changes in the damaged cells, characterized by globulation and enlargement. The plasma protein showed a constant reduction in total protein level, in albumin fraction and fibrinogen component and the elevation of β -globulin. R.T.L.

(222b) From observations on the effects on the adrenal cortex of experimental infections of the dog with *Ancylostoma caninum*, of the rabbit with *Schistosoma japonicum* and of natural infection of cattle with *Fasciola hepatica*, Takagi suggests that its functional activity is too severely injured to secrete or store adrenal steroids and that the adrenal insufficiency resulting from the toxæmia is due to the by-products of the parasites. R.T.L.

23—Hassadeh.

- a. MINTZ, G., 1956.—[Research on nematodes in U.S.A.] 36 (5), 385–386; (6), 496–498. [In Hebrew.]

24—Igaku Kenkyu. Kyushu University.

- a. TAKEICHI, T., 1956.—[A morphological study on the adult form of *Gnathostoma spinigerum*.] 26 (10), 2600–2634. [In Japanese: English summary pp. 2628–2632.]
- b. KIKUCHI, T., 1956.—[An investigation into the geographical distribution of *Gnathostoma spinigerum* and an experimental study of its route of infection.] 26 (11), 2943–2970. [In Japanese: English summary pp. 2967–2968.]

(224a) A detailed description of the morphology and histology of the adult of *Gnathostoma spinigerum* is illustrated by 47 text figures and 12 figures on two plates. R.T.L.

(224b) In a large number of *Ophicephalus argus* from different parts of Japan *Gnathostoma spinigerum* larvae were found in the muscles; the frequency in a given muscle was dependent on the distance between the muscle and the antero-lateral part of the body. The Prefectures in which infected fish were collected were Kumamoto, Kagawa, Hyogo, Osaka, Nara and Shiga. The following were experimentally infected: the crustaceans *Cambarus clarkii*, *Eriocheir japonicus* and *Potamon dehaani*; the fishes *Ophicephalus argus*, *Anguilla japonica*, *Misgurnus anguillicaudatus*, *Parasilurus asotus*, *Cyprinus auratus*, *C. carpio* and the Japanese goldfish; the reptiles *Geoclemys reevesii*, *Elaphe quadrivirgata*, *Natrix t. tigrina*, *Takydromus tachydromoides* and *Gecko japonicus*; the amphibians *Rana n. nigromaculata*, *R. catesbiana*, *R. rugosa*, *R. limnocharis*, *Hyla arborea japonica*, *Bufo vulgaris formosus*, *Hynobius naevius* and *Triturus pyrrhogaster*; the bird *Gorsachius goisagi* and the mammals *Rattus norvegicus* var. *albinus*, *Cavia cobaya* and *Sus scrofa domesticus*. When gnathostome larvae were fed to *R. limnocharis* the larvae penetrated the gut wall in about half an hour, reached the muscles in about two hours and began to encyst there in 20 days. The third-stage larva can be transferred, unaltered, to several second intermediate hosts, one after the other, and from a warm-blooded to a cold-blooded host. The adults could also be transferred from one definitive host to another. Of the many rats infected with the larvae two contained also a single adult each. R.T.L.

225—Igiene Moderna.

- a. KOIZUMI, K., 1956.—“Studies on the hemolytic reaction of antigen extracted from adult *Paragonimus westermani*.” 49 (3/4), 348–352. [French, German, Italian & Esperanto summaries pp. 351–352.]

(225a) Koizumi prepared antigens from adult *Paragonimus westermani* and from the capsules enclosing them by extraction with hot physiological saline. The flukes were obtained from the lungs of an experimentally infected cat. Positive results were obtained with Middlebrook's haemolytic reaction when sheep red cells sensitized with the adult antigen and immune serum from the cat were used. Normal cat and normal and syphilitic human serum showed no haemolytic titre. Although haemolysis did occur when the capsule antigen was used the titre was considerably lower than that for the adult antigen. S.W.

226—Indian Journal of Medical Sciences.

- a. MODI, C. J., DAVE, C. V. & OZA, J. L., 1956.—“Piperazine therapy in threadworm infestation.” 10 (4), 278–280.

227—Indian Veterinary Journal.

- a. SIRCAR, R. N., 1956.—“Helminthic diseases of sheep in Bihar and their control.” 33 (2), 111–119.
 b. HADIS, S. M., 1956.—“Spirocerosis in dogs in Bihar.” 33 (2), 139–141.
 c. BISWAL, G. & DAS, L. N., 1956.—“Observations on the treatment of nasal schistosomiasis in cattle and buffaloes in Orissa.” 33 (3), 204–216.
 d. ALWAR, V. S., 1956.—“Nasal granuloma in the State of West Bengal.” [Correspondence.] 33 (3), 254–255.

(227a) Conditions in the State of Bihar are very favourable to the spread of various helminth infections in sheep which are kept in nomad flocks by a class of villagers known as Gareries. Helminths seriously affected the breeding programmes on the Government breeding farms at Patna and Gaya. The results of an investigation into gastro-intestinal parasites in the sheep on these farms are tabulated. Although the administration of phenothiazine as a drench proved effective in lowering the level of infection with stomach worms, it did not eliminate the worms altogether. Hexachlorethane was apparently successful in controlling amphistome infection. R.T.L.

(227b) The occurrence of *Spirocerca lupi* in dogs in Bihar is recorded for the first time. It is very common in the Punjab, United Provinces and Madras. R.T.L.

(227c) Nasal schistosomiasis, due apparently to *Schistosoma nasalis*, is reported to be very common in cattle and buffaloes at Keonjhar, Orissa, India. Sodium antimony tartrate, antimony tartrate, anthiomaline and foudadin were used. None eradicated the infection, but sodium antimony tartrate proved superior to the others. Although the pond where the infection was acquired dried out during the severe drought in 1953–54, the molluscan fauna did not appear to be affected. R.T.L.

(227d) Although Choudhury has reported *Limnaea acuminata* as the intermediate host of *Schistosoma nasalis* in Bengal, Varma and Peter only observed its cercaria, *Cercaria indica* XXX, in *Limnaea luteola* and *Indoplanorbis exustus*. Sewell recorded it from *L. acuminata* and *I. exustus* from Calcutta, but only in *I. exustus* in Madras State. Rao, Varma and Peter did not find naturally infected *L. acuminata* in Madras and Bihar. The authenticity of *L. acuminata* as a vector of *S. nasalis* in West Bengal is therefore questionable. R.T.L.

228—Irish Veterinary Journal.

- a. CORCORAN, J. F., 1956.—“A method for the control of hoose (*Dictyocaulus viviparus*).” 10 (6), 118.

(228a) Pastures can be cleared of infestation with “hoose” by using adult resistant cows to ingest and destroy the third-stage larvae of *Dictyocaulus viviparus* in October or early

November of the year preceding that in which calves are to be reared on the field. The pastures should be grass-harrowed thoroughly, as often as weather permits, to ensure closer grazing by the cows.

R.T.L.

229—Japanese Journal of Medical Science and Biology.

- a. ITO, J., 1956.—“Study on the cercaria and metacercaria of *Pseudexorchis major* (Hasegawa, 1935) Yamaguti, 1938, especially on the development of its metacercaria, (Heterophyeidae, Trematoda).” **9** (1/2), 1-16.

(229a) Redescribing the parapleurolophocercous cercaria of *Pseudexorchis major* from *Semisulcospira libertina*, *S. japonica* and *S. reiniana* in Japan, Ito finds it has 12 pairs of flame cells, with a formula of $2[(2+2+2)+(2+2+2)]=24$, which persist in the metacercarial stages and are of importance in its differential diagnosis from the cercaria and metacercaria of *Clonorchis sinensis* of which the formula is $2[(3+3)+(3+3+3)]=30$. There are ten pairs of long sensory hairs on the cercarial body but they are very feeble and easily destroyed. The oral spines number eight to eleven in the anterior row, four to six in the middle row and usually three in the posterior row. The goldfish, *Carassius carassius*, was experimentally infected. The cercariae attach themselves to the fins and encyst within the fin ray. Illustrated details are given of the metamorphosis during the five hours and one, three, five, seven, ten, 14 and 21 days after penetration. Ito was unable to confirm that progenesis occurs but is inclined to accept Hasegawa's statement (1935) as the size and shape of mature cercariae and of their internal organs scarcely differ from those of adults, apart from the absence of eggs. The geographical distribution of this parapleurolophocercous cercaria in *Semisulcospira* spp. in Japan, its seasonal fluctuation in *Semisulcospira* spp. in Kano River, Shizuoka Prefecture, and data showing the correlation of the infection rate of cercaria to the length of its molluscan host are tabulated.

R.T.L.

230—Japanese Journal of the Nation's Health.

- a. HOB0, B., 1956.—[Epidemiological studies on *Ascaris* infection among prisoners and the length of life of *Ascaris lumbricoides* in human host.] **25** (1), 1-14. [In Japanese: English summary p. 1.]

(230a) The incidence of *Ascaris lumbricoides* in prisoners in Kyoto City decreased steadily with the length of confinement and fell from 56.6% in January 1952 to 17% in May 1955. This is attributed to the limited supply of raw vegetables and fruit. The length of life of the worm is estimated at from 10 to 24 months.

R.T.L.

231—Japanese Journal of Veterinary Research.

- a. YAMASHITA, J., OHBAYASHI, M. & KONNO, S., 1956.—“Studies on echinococcosis. I. On two natural cases in sheep.” **4** (1), 1-4.

232—Journal of the American Medical Association.

- a. BROWN, H. W., CHAN, K. F. & HUSSEY, K. L., 1956.—“Treatment of enterobiasis and ascariasis with piperazine.” **161** (6), 515-520.
 b. AVERY, J. L., 1956.—“Treatment of enterobiasis with one oral dose of promethazine hydrochloride.” **161** (8), 681-683.
 c. HOEKENGA, M. T., 1956.—“Ocular toxicity of Whipcide (3-methyl-1-pentyn-3-yl acid phthalate) in humans.” **161** (13), 1252-1253.

(232a) A single seven-day course of piperazine citrate syrup cured *Enterobius* infections in 58 out of 60 patients and proved slightly better than 10-day or 14-day courses in which the dosage was divided into two or three doses given at meal times. Piperazine phosphate and calcium dipiperazine were effective substitutes. Approximately 94% of *Ascaris* infections were cured by a two-day course of piperazine citrate syrup when given in single doses of 20 c.c. to 35 c.c., according to body-weight, one-and-a-half to three hours after breakfast on one or two

consecutive days. *Necator americanus*, *Trichuris trichiura*, *Strongyloides stercoralis* and *Hymenolepis nana* gave little or no response to piperazine therapy, but large doses removed adult *Trichinella spiralis* from mice. R.T.L.

(232b) After a single dose of 125 mg. of promethazine hydrochloride, taken at bedtime, 100 children and adults were freed from *Enterobius* infection. This drug is inexpensive and non-toxic but some of the children had nightmares which is attributed to the abrupt release of toxic by-products of heavy infestations. R.T.L.

(232c) Whipcide given daily to 143 adult Hondurans in doses of 20 to 145 mg. per kg. body-weight for four to five days was only 22% effective against *Trichuris trichiura*. A 50% cure rate was obtained by single doses of 100 to 200 mg. per kg., but 9.5% of the patients developed temporarily severe conjunctivitis and keratitis. The seven patients who received a single dose of 200 mg. were all cured but all developed ocular complications. R.T.L.

233—Journal of the American Society of Sugar Beet Technologists.

- a. SWINK, J. F. & FINKNER, R. E., 1956.—“Galactinol-weight relationships in breeding for resistance to the sugar beet nematode.” 9, 70-73.

(233a) An inverse relationship between galactinol content and yield has been shown in sugar-beet plants selected for tolerance to the beet eelworm *Heterodera schachtii* Schmidt. H.R.W.

234—Journal of the American Veterinary Medical Association.

- a. PARMELEE, W. E., LEE, R. D., WAGNER, E. D. & BURNETT, H. S., 1956.—“A survey of *Thelazia californiensis*, a mammalian eye worm, with new locality records.” 129 (7), 325-327.
- b. LEVINE, N. D. & AVES, I. J., 1956.—“The incidence of gastrointestinal nematodes in Illinois cattle.” 129 (7), 331-332.
- c. TURK, R. D., GAAFAR, S. M. & LYND, F. T., 1956.—“A note on the occurrence of the nematodes, *Dirofilaria immitis* and *Ancylostoma braziliense* in unusual locations.” 129 (9), 421.
- d. ALICATA, J. E. & KOSHI, J. H., 1956.—“Observations on the stability of phenothiazine in cane molasses in relation to parasite control.” 129 (9), 428-429.
- e. JASKOSKI, B. J. & COLGLAZIER, M. L., 1956.—“A report of *Strongylus asini* from the United States.” 129 (11), 513-514.
- f. SOLTYS, A., 1956.—“Heartworms in the dog.” 129 (11), 520-521.

(234a) Information on the occurrence of *Thelazia californiensis* collected from 35 veterinarians in California during 1955 and from previously published reports is tabulated under each of 39 counties and the geographical distribution of the cases is shown on a map. The infected hosts now reported by the veterinarians are 81 dogs, 12 cats, 7 horses and one human being. Published reports give dog, cat, coyote, sheep, deer and man. In a personal communication A. C. Schneider has notified the first case, in a dog, in Oregon. R.T.L.

(234b) The number of strongylate eggs (excluding *Nematodirus*) found per gm. of faeces collected from 135 cattle on 24 farms selected at random in the vicinity of Urbana is tabulated. It is concluded that adult cattle in this area do not suffer, in general, from serious parasitism. R.T.L.

(234c) Three instances are recorded of dogs in which *Dirofilaria immitis* adults were absent from the heart and the peripheral blood contained no microfilariae yet adult worms were found at autopsy in the bronchioles. It is also reported that large numbers of adult *Ancylostoma braziliense* were found attached to the walls of the colon and caecum of a dog in a city on the Gulf Coast of Texas. R.T.L.

(234d) Phenothiazine mixed in cane molasses (at the rate of 2 gm. in 20 c.c.), after being kept for two months was found to have retained its efficacy in reducing light and medium infections of *Cooperia*, *Haemonchus* and *Bunostomum* in heifers, when 20 c.c. were administered daily in capsules. R.T.L.

(234e) Mature specimens of *Strongylus asini*, which was originally described from *Equus asinus* in Africa, were found in cysts in the liver of a Grevy zebra, *Equus grevyi*, at the Chicago Zoological Park. They caused extensive damage followed by death from peritonitis.

R.T.L.

5—Journal of the British Grassland Society.

- a. SPEDDING, C. R. W., 1956.—“Worm-infestation of sheep in relation to ley farming.” 11 (2), 99–103.

(235a) It was confirmed that a ley sown on land which had carried no ruminant stock for two years was free from all species of worms parasitic in sheep. The absence of *Strongyloides pillosus* eggs in the faeces of a lamb grazed on such a ley indicated that when folded lambs became infected with this species they acquired it from the ewes. This occurred in spite of the management, and is probably related to the mode of entry of the infective larvae. Grazing management determines whether the advantage of a new ley is exploited or lost. An experiment carried out on a pasture rested for only six months showed that if clean lambs are folded on it under a system of management which precludes reinfection from the lambs themselves and their ewes, the resultant infection is very light. Some tentative conclusions are presented as a result of a further experiment to determine whether grazing by sheep every year produces a gradual build-up of pasture infection. The advantage of lambing on a clean pasture depends on the standard of management, which must prevent reinfection. A change to a clean pasture when the lambs are six to eight weeks old is beneficial, especially if a rapid rotational grazing system is followed. Also, it is beneficial to wean lambs on a clean pasture, but it is emphasized that the weather can make an enormous difference to the rate at which reinfection occurs. This last factor alone prevents the formulation of any rigid rules for the control of worm infestations.

D.M.

36—Journal of Comparative Pathology and Therapeutics.

- a. ROSE, J. H., 1956.—“The bionomics of the free-living larvae of *Dictyocaulus viviparus*.” 66 (3), 228–240.
 b. MICHEL, J. F., 1956.—“Studies on host resistance to *Dictyocaulus* infection. II. Re-infection experiments with *D. filaria* in sheep.” 66 (3), 241–248.

(236a) In studies on the effects of temperature, humidity and desiccation on the longevity of *Dictyocaulus viviparus* larvae on pasture it was found that clover foliage gave no greater protection than grass on a well-grown ley. Dryness and high temperatures were largely responsible for the short life of the larvae in the summer. The maximum longevity on wet surfaces increased as the temperature lowered. A few larvae survived for six months during the wet year 1954. Few larvae migrated on to the surrounding pasture from faecal pats and large numbers reached infective positions on herbage only when the faeces was thinly spread. A small percentage of larvae survived temperatures below freezing point and were successful in overwintering. As the temperature fell the rate of development was slowed. Third-stage larvae were observed after three days at 25°C., while at 5°C. they were not seen until after 26 days. In January they were only observed out of doors after four weeks. In water at 3°C. to 5°C. a few survived for twelve months.

R.T.L.

(236b) Evidence is presented that lambs acquire resistance to *Dictyocaulus filaria* not through increasing age but from previous infection and that this resistance is chiefly due to the failure of the worms to reach and establish themselves in the lungs.

R.T.L.

237—Journal of the Department of Agriculture. Dublin.

- a. CARROLL, J., 1956.—“Eelworm and insect pest problems.” 52, 44–55.

(237a) In this lecture, at a conference with instructors in agriculture, Carroll mentions that in the Republic of Ireland the potato-root eelworm has already brought to an end the growing of early potatoes in the sandy regions at Rush, the production of seed potatoes in a

large number of fields in midland areas and the growing of potatoes in many plots and gardens all over the country. Cereal-root eelworm is now widely prevalent, but the beet eelworm has as yet a limited distribution.

R.T.L.

238—Journal of Diseases of Children.

- a. BEDDOE, H. L., 1956.—“Peritoneal granuloma due to *Enterobius vermicularis*.” 91 (6) 577-580.

(238a) A large pelvic granuloma containing ova and adult *Enterobius vermicularis* was surgically removed from a 16-month-old child. As all reported cases of this condition have been in female patients it would appear that the worm reaches the peritoneal cavity by way of the genital tract.

R.T.L.

239—Journal of Experimental Biology.

- a. MANN, K. H., 1956.—“A study of the oxygen consumption of five species of leech.” 33 (3) 615-626.

(239a) The oxygen consumption of *Glossiphonia complanata*, *Erpobdella octoculata*, *E. testacea*, *Helobdella stagnalis* and *Piscicola geometra* is considered in relation to their oecology.

R.T.L.

240—Journal of Helminthology.

- a. SANDARS, D. F., 1956.—“*Mirandula parva* gen. et sp. nov. (Cestoda, Dilepididae) from the long-nosed bandicoot (*Perameles nasuta* Geoff.).” 30 (4), 183-188.
 b. ABDOU, A. H., 1956.—“Observations on the life cycle of *Davainea proglottina* in Britain.” 30 (4), 189-202.
 c. YEH, L. S., 1956.—“On *Kalicephalus hongkongensis* n.sp. from *Elaphe moellendorffi* and the erection of a new genus, *Kalicephaloides*.” 30 (4), 203-210.
 d. YEH, L. S., 1956.—“On some helminths from a king cobra in Malaya including *Occipitodontus edesoni* n.sp. and *Ophiotaenia kuantanensis* n.sp.” 30 (4), 211-216.
 e. BISSERU, B., 1956.—“On three new species of strigide trematodes from an African crocodile and the erection of a new family, *Neostrigeidae*.” 30 (4), 217-232.

(240a) *Mirandula parva* n.g., n.sp. in a long-nosed bandicoot, *Perameles nasuta*, from South Queensland, has an armed rostellum, unarmed suckers and a persistent sac-shaped uterus. The new genus is placed in the Dilepidinae and is the first record of a double-pore tapeworm in this subfamily. The strobila of *M. parva* has only four segments, and measures only 1.00-1.41 mm. including an extremely large retractile rostellum which carries a double row of 36 hooks. There are four spherical transversely placed testes and a spherical ovary.

R.T.L.

(240b) Abdou describes a technique for keeping slugs alive and breeding them in the laboratory, and gives a simple method for differentiating the various British species. To the known intermediate hosts of *Davainea proglottina* are added *Agriolimax reticulatus*, *A. carvanae*, *Milax gracilis* and *M. sowerbyi* which were experimentally infected by Abdou. The most important intermediaries for *D. proglottina* in Britain are the widely prevalent *A. reticulatus* and *Arion hortensis*.

R.T.L.

(240c) *Kalicephalus indicus* is redescribed and figured from the snake, *Ptyas mucosus*, in Canton. *Kalicephalus hongkongensis* n.sp. from the snake, *Elaphe moellendorffi*, from Hong Kong, is very small. The male is 2.8-3.1 mm. and the female 3.7-4.1 mm. in length. It approaches *K. sinensis* but differs in the ramifications of the dorsal ray and in the size of the lateral rays and in the head region which are illustrated. Attention is drawn to the presence of a telamon as well as a gubernaculum in species of *Kalicephalus*. Although hitherto unrecorded, Yeh Liang-Sheng has always found it in the large number of species he has examined. Examination of the paratypes of *Occipitodontus fimbriatus* shows that this genus is not a synonym of

Kalicephalus and should be retained. *Diaphanocephalus minutus* which was transferred to *Kalicephalus* by Ortlepp, is made the genotype of *Kalicephaloides* n.g. as the spicules are unequal and one of the terminal branches of the dorsal ray originates at its base. R.T.L.

(240d) The king cobra, *Naja hannah* from Malaya, is recorded as a new host for *Styphlodora persimilis*, *Bothridium pithonis* and *Occipitodontus fimbriatus*. From the same host are described: (i) *Ophiotaenia kuantanensis* n.sp. which differs from *O. grandis* in that the shape of the scolex is oblong, the suckers are twice as large, proglottides are smaller, the genital aperture is placed more anteriorly and the testes are more numerous numbering 250-350; (ii) *Occipitodontus edesoni* n.sp. differs from *O. fimbriatus* in its smaller size, thinner cuticle, more posterior position of the excretory pore and its poorly developed oesophageal teeth. R.T.L.

(240e) Owing to the presence of a paraprostata which is unknown in the Strigeidae, Bisserru erects a new family named *Neostrigeidae* for three new species of strigeids found parasitic in *Crocodylus niloticus*, in Northern Rhodesia, by leRoux, viz., *Neostrigea africana* n.g., n.sp., *N. leiperi* n.sp. and *Prostrigea arcuata* n.g., n.sp. These two new genera are closely related, but in *Neostrigea* the paraprostata is independent of, and dorsal to, the male genital duct and consists of a more or less muscular sac-like reservoir opening into the male genital duct by an efferent prostatic canal. In *Prostrigea* the paraprostata is a cellular mass discharging directly into the ejaculatory canal. In *N. africana* the paraprostata is small, weakly muscular and its canal enters the ejaculatory duct near where it opens into the uterus, whereas in *N. leiperi* it is larger and more muscular, and discharges into the ejaculatory duct by a short canal far from its opening into the uterus. R.T.L.

241—Journal of Immunology.

- a. WEINER, L. M. & PRICE, S., 1956.—“A study of antigenic relationships between *Trichinella spiralis* and *Salmonella typhi*.” 77 (2), 111-114.

(241a) Using normal rabbits immunized either with an antigen prepared from *Trichinella spiralis* larvae or with *Salmonella typhi* antigens, Weiner & Price have shown that a true hetero-genetic reaction exists between the two organisms. Anti-*Trichinella* serum reacted to a titre of 1:100 with typhoid “O” and 1:1,000 with typhoid “H” antigens. Anti-typhoid serum reacted with the *Trichinella* larval antigen to a titre of 1:800. Absorption studies confirmed these observations. Cross reactions also took place with *Salmonella paratyphi* A, B and C and with *Klebsiella pneumoniae*. They describe the case of a child, where the complete case history was available, in whom there was no history of trichinellosis and no specific symptoms of this disease and who was diagnosed as having typhoid fever; the serum reacted positively with *Trichinella* larval antigen to a titre of 1:1,500. S.W.

242—Journal of the Indian Medical Association.

- a. DHANDA, L., 1956.—“Infestation with ova morphologically resembling *Schistosoma haematobium*.” 26 (11), 407-408.
b. ANON., 1956.—“Schistosomiasis in India.” [Editorial.] 26 (11), 430-431.

(242a) Eggs resembling those of *Schistosoma haematobium* were accidentally found in four individuals during the routine stool examination of 500 persons at Delhi. None had any symptoms of urinary schistosomiasis and no eggs were found in the urine. Two had never lived south or east of Delhi but one had visited Mussoorie in Uttar Pradesh and one lived slightly south of Delhi at Gurgaon. R.T.L.

(242b) This editorial reviews the various publications in which the occurrence of schistosome infections in India have been reported and discussed. It recalls the difficulty of distinguishing the eggs of *Schistosoma haematobium* from those of *S. bomfordi*, *S. spindasi* and *S. indicum* and urges that an extensive investigation should now be undertaken. R.T.M.

243—Journal of Infectious Diseases.

- a. LEWERT, R. M. & LEE, C. L., 1956.—“Quantitative studies of the collagenase-like enzymes of cercariae of *Schistosoma mansoni* and the larvae of *Strongyloides ratti*.” 99 (1), 1-14.
- b. LEE, C. L. & LEWERT, R. M., 1956.—“The maintenance of *Schistosoma mansoni* in the laboratory.” 99 (1), 15-20.
- c. LARSH, Jr., J. E., RACE, G. J. & JEFFRIES, W. B., 1956.—“The association in young mice of intestinal inflammation and the loss of adult worms following an initial infection with *Trichinella spiralis*.” 99 (1), 63-71.

(243a) Lewert & Lee have studied the proteolytic enzymes in cercariae of *Schistosoma mansoni* and filariform larvae of *Strongyloides ratti* and have compared them with bacterial collagenase (*Clostridium welchii*) and trypsin. They describe their experimental procedure in detail. As the larvae penetrate the skin they alter the polysaccharide-containing protein collagen fibres, reticular fibres and protein bound sulph-hydryl groups. *In vitro* larvae can act on azo dye-coupled collagens and gelatin. Sterile saline extracts show a high degree of activity and can degrade azo dye-coupled collagens, uncoupled collagens, gelatin, frozen dried skin sections and, in the case of *Schistosoma mansoni*, haemoglobin. The helminth enzymes (and the bacterial collagenase) differ from trypsin in that they are active against cartilage or azo-cartilage and are not inhibited by dilute normal serum: they differ from the bacterial collagenase in that their activity against native purified collagen is slight: they differ from each other in that the optimal pH in phosphate buffer is near 7.5 for *S. mansoni* and near 7.0 for *Strongyloides ratti*, and in their sensitivity to various metal ions. The enzymes derived from the cercariae is inhibited by agents which bind sulph-hydryl groups but these do not affect the nematode larval enzyme; the latter however is more sensitive to chelating agents and to compounds containing the sulph-hydryl radical. A chelating agent was able to inhibit skin penetration by both larvae without apparently damaging them. S.W.

(243b) Lee & Lewert have found white porcelain-covered metal refrigerator vegetable trays (5×9×13 inches in size) to be most satisfactory as aquaria for *Australorbis glabratus*: each tray will accommodate 50 to 100 snails. No sand or vegetation is included but one or more “food floats” (made from four corks joined by thin sealed glass tubes covered with a nylon hair net with mesh large enough for the snails to pass through) are placed on the water surface. A technique for preparing the calcium alginate food preparation in the form of a continuous strand and by means of which 10 litres can be processed in four hours by one person is described. The infection of snails with miracidia, exposure of mice to cercariae and disposal of contaminated articles are discussed. S.W.

(243c) Larsh *et al.* infected 36 mice, five weeks old and approximately the same weight each with 300 *Trichinella spiralis* larvae given orally. Two males and two females were killed on the 7th, 9th, 11th, 13th, 15th, 17th, 19th and 21st day after infection and the average number of adult worms in the intestines counted and the histopathology of the intestines studied. There was a significant loss of worms between the 15th and 17th days. The histopathology was similar to that observed in old mice, with a mild early reaction, a moderately severe acute reaction and a subacute or chronic diminishing reaction. During the acute phase, polymorphonuclear leucocytes were the most prominent cells; mixed mononuclear cells characterized the chronic phase. Compared with the reactions in old mice the cellular response was delayed and even at its peak did not reach the severe proportions observed in old mice. In both young and old however, the peak was about five days before the significant loss of worms occurred. It would appear that young mice do not develop acquired immunity as rapidly as old mice. There are six photomicrographs of sections of the intestinal mucosa at various stages of the infection. S.W.

244—Journal of the Iraqi Medical Professions.

- a. WATSON, J. M. & NAJIM, A. T., 1956.—“Studies on bilharziasis in Iraq. Part XI. Observations on schistosome dermatitis.” 4 (1), 4-10.

(244a) Dermatitis due to non-human schistosome cercariae is rare in Iraq. Apparent schistosome dermatitis cases are common during the warm season at Kurmat Beni Saad. Others are reported from Tel Mohammed near Baghdad, near Baqubah and at Jebäiyish. In all of these cases pruritus started within 20 to 30 minutes after entering the water and lasted for three to five days. In one instance a European, while shooting, contracted pruritus when wading in a marsh in December. Two of the cases, although free from infection at the time, developed schistosomiasis haematobia three months later, but the others may have been due to cercariae of *Schistosoma turkestanicum* or *Bilharziella* sp. (it is incidentally mentioned here that the vector of *S. turkestanicum* is *Limnaea tenera euphratica*). R.T.L.

245—Journal of Laboratory and Clinical Medicine.

- a. HARRIS, J. W., 1956.—“Studies on the mechanism of a drug-induced hemolytic anemia.” 47 (5), 760-775.

246—Journal of the Marine Biological Association of the United Kingdom.

- a. LLEWELLYN, J., 1956.—“The host-specificity, micro-ecology, adhesive attitudes, and comparative morphology of some trematode gill parasites.” 35 (1), 113-127.
b. LLEWELLYN, J., 1956.—“The adhesive mechanisms of monogenetic trematodes: the attachment of *Plectanocotyle gurnardi* (v. Ben. & Hesse) to the gills of *Trigla*.” 35 (3), 507-514.

(246a) More than 900 diclidophoroidean trematodes belonging to 18 species were collected from a total of 2,104 fish belonging to 17 species. All but *Plectanocotyle gurnardi* which occurred on three species of *Trigla* were strictly specific to their particular hosts. Only one host, *Trachurus trachurus*, harboured more than one species of parasite. Without exception the trematodes were attached with their posterior adhesive organs nearer to the gill arch and the anterior end nearer to the distal end of the primary lamellae; all but two species were attached to the secondary gill lamellae. In most cases there was a characteristic differential distribution of the parasite among the gill arches and it is suggested that this is not due to a choice exercised by the parasites but to variations in the flow of water over the different gills. The morphological variation could in each case be related to the characteristic adhesive attitude of the species. S.W.

(246b) Llewellyn has made a detailed study of the adhesive mechanism of *Plectanocotyle gurnardi*. It consists of three pairs of clamps and two, or sometimes three, pairs of hooks which are borne on a posterior appendage. Each clamp consists of a postero-ventrally directed pair of hinged opposable jaws; the hinge lies approximately transversely across the body and the posterior jaw is the “movable jaw”. There is a single J-shaped sclerite in the sagittal plane of each clamp, and the posterior distal end constitutes a “fair-lead” as previously described in *Kuhnia scomбри*; two systems of sclerites support the peripheral regions of the jaws. The sclerites and the musculature are described in detail and illustrated. On the basis of the clamp structure *P. gurnardi* appears to be more nearly related to the Mazocraeidae than to the Discocoryliidae. S.W.

247—Journal of Parasitology.

- a. CRAM, E. B., 1956.—“Stepping stones in the history of the American Society of Parasitologists.” [Presidential Address.] 42 (5), 461-473.
b. COKER, C. M., 1956.—“Effects of cortisone on cellular inflammation in the musculature of mice given one infection with *Trichinella spiralis*.” 42 (5), 479-484.
c. VOGEL, M., 1956.—“Studies on the life history of *Hymenolepis citelli* (McLeod, 1933) (Cestoda: Cyclophyllidae).” 42 (5), 485-490.
d. LEVINE, N. D., CLARK, D. T. & HANSON, L. E., 1956.—“Encephalitis in a swan due to *Dendritobilharzia* sp. (Trematoda: Schistosomatidae).” 42 (5), 496-500.

- e. THOMAS, L. J. & BABERO, B. B., 1956.—“Some helminths of mammals from St. Lawrence Island, Alaska, with a discussion on the nomenclature of *Echinococcus* in voles.” 42 (5), 500.
- f. THORSON, R. E., 1956.—“The stimulation of acquired immunity in dogs by injections of extracts of the esophagus of adult hookworms.” 42 (5), 501-504.
- g. WYKOFF, D. E. & ALTMANN, S. A., 1956.—“Ovicidal activity of certain compounds on the embryonated eggs of *Ascaris lumbricoides*.” 42 (5), 504.
- h. ATCHLEY, F. O., HEMPHILL, E. C. & HUNT, D. W., 1956.—“Current status of intestinal parasitism of man in eastern Kentucky.” 42 (5), 505-509.
- i. CABLE, R. M. & MYERS, R. M. E., 1956.—“A dioecious species of *Gyrocotelia* (Cestoda: Acoelidae) from the naped plover.” 42 (5), 510-515.
- j. LESSER, E., 1956.—“Parasitism in Korea.” 42 (5), 515.
- k. NAGATY, H. F., 1956.—“Trematodes of fishes from the Red Sea. Part 7. On two gyliuchenids and three allocreadoids, including four new species.” 42 (5), 523-527.
- l. FRICK, L. P., LIN, S. S. & WILLIAMS, J. E., 1956.—“Efficacy of Abbott's Insect Repellent Cream (E4856) in preventing *Schistosoma japonicum* infections in mice.” 42 (5), 528-530.
- m. CAMPBELL, W. C. & TODD, A. C., 1956.—“The fringed tapeworm in Wisconsin.” 42 (5), 530.
- n. SCHILLER, E. L., 1956.—“Studies on the helminth fauna of Alaska. XXIX. *Urinatrema aspinosum* n.sp. (Trematoda: Zoogonidae) from the urinary bladder of the greenling, *Hexagrammos superciliosus* (Pallas).” 42 (5), 531-532.
- o. SCHACHER, J. F. & FAUST, E. C., 1956.—“Occurrence of *Diocotophyma renale* in Louisiana, with remarks on the size of infertile eggs of this species.” 42 (5), 533-535.
- p. WELLS, W. H., 1956.—“A cursory survey of human intestinal parasites in the nomadic people of southern Turkey.” 42 (5), 535.
- q. BRAVO-HOLLIS, M. & SOGANDARES-BERNAL, F., 1956.—“Trematodes of marine fishes of Mexican waters IX. Four gasterostomes from the Pacific Coast.” 42 (5), 536-539.
- r. BURTON, P. R., 1956.—“Morphology of *Ascocotyle leighi* n.sp. (Heterophyidae), an avian trematode with metacercaria restricted to the conus arteriosus of the fish, *Mollienesia latipinna* Le Sueur.” 42 (5), 540-543.
- s. HANSON, H. C., 1956.—“A three-year survey of *Ornithofilaria* sp. microfilariae in Canada geese.” 42 (5), 543.
- t. VOGUE, M. & RAUSCH, R., 1956.—“Observations on *Shipleya inermis* Fuhrmann, 1908 (Cestoda: Acoelidae).” 42 (5), 547-551.
- u. MADSEN, D. E., DISSAMARN, R. & CHOMANAN, T., 1956.—“Microfilaria in elephants.” 42 (5), 552.
- v. JEFFERY, G. M., 1956.—“Intestinal parasites in a Georgia mental hospital.” 42 (5), 553-555.

(247b) From experiments on four groups of mice, Coker has shown that daily injections of 0.5 mg. of cortisone, commencing two days before and continuing for 30 days after infection with *Trichinella spiralis* larvae, will cause almost complete suppression of the normal cellular infiltration into the musculature. When the cortisone injections were discontinued from the 14th day after infection a striking general myositis was apparent 21 and 30 days after infection. In spite of this, however, there was no reduction in the numbers of larvae recovered from the musculature of the latter group. In the two control groups, which received either no injections or 0.85% sodium chloride the myositis was acute 21 days after infection but had partially subsided by the 30th day and there appeared to be a tendency for consolidation around the worms.

S.W.

(247c) Voge has completed the life-cycle of *Hymenolepis citelli* experimentally and has compared the various stages with those of *H. diminuta*. Ova of *H. citelli* were obtained from naturally infected *Citellus beecheyi* and were fed to laboratory-reared *Tenebrio molitor* and *Tribolium confusum*; development to the infective cysticercoids at room temperature took 14 days. During this phase the external development and subsequent invagination of the scolex which occurs in *H. diminuta* was not observed. Ground squirrels, rats and albino mice were infected with the cysticercoids; eggs appeared in the faeces of the ground squirrels 18 days later, in those of the rats 19 to 20 days later and in the mice 14 and 16 days after infection. The adult worms in the rats and mice were considerably smaller.

S.W.

(247d) Histological examination of sections of the brain of a ewe, which died suffering from encephalitis, revealed an adult trematode in a small artery in the meninges between the cerebral hemispheres and numerous eggs in the cerebrum. Fragments of worms were also

recovered from the mesenteric blood vessels attached to a segment of the small intestine and numerous fluke eggs were found in the vessels of the liver, pancreas, villi of the duodenum, and submucosa of the gizzard. The parasite is identified as *Dendritobilharzia* sp. The paper is illustrated by five photomicrographs. s.w.

(247e) Thomas & Babero discuss the nomenclature of the species of *Echinococcus* which produces alveolar or multilocular hydatids in voles in St. Lawrence Island. They are convinced that this form is specifically identical with the alveolar type existing in Eurasia and contend that the cestode designated by Rausch & Schiller as *Echinococcus sibiricensis* is not new. The name should, therefore, be considered invalid. s.w.

(247f) Thorson prepared an extract of the oesophagi of adult *Ancylostoma caninum*; 1 ml. of the solution represented the extraction of approximately 200 oesophagi in physiological saline and contained 80 μ gm. of protein nitrogen. This was injected subcutaneously into four puppies to a total of 3.6 ml. per puppy given on the first, third, fifth, eighth, tenth, twelfth and fifteenth days of the experiment in increasing doses. On the 19th day these puppies and three controls (all from the same litter) were infected subcutaneously with 250 larvae of *A. caninum*. The faeces were examined daily from the 12th to the 20th day after infection when the dogs were killed and the entire intestine examined for worms. There was some reduction in the worm burden of the injected dogs and the worms were significantly smaller but there was no inhibition of egg production in the females. s.w.

(247g) Wykoff & Altmann tested a number of chemicals for their effect on ova of *Ascaris lumbricoides*. At dilutions of 1:10,000 repeated tests of 4-thiocyano-o-cresol, 4-thiocyano-m-cresol, 4-thiocyano-o-ethylphenol, 4-thiocyano-2,6-xyleneol, 4-thiocyano-3,5-xyleneol and acridine killed 80% or more of the larvae: single tests at the same dilution with copper acetonyl acetone, methallyl chloride, dio-o-tolyl thiourea and cincophane gave similar results. Irregular results were obtained with higher dilutions of the 4-thiocyano compounds. s.w.

(247h) In eastern Kentucky one out of every three children under ten years old examined harboured *Ascaris lumbricoides*. *Trichuris trichiura* and *Strongyloides stercoralis* were also of importance but the incidence of hookworm was low. s.w.

(247i) Cable & Myers describe and illustrate a species of *Gyrocoelia* from *Pagolla wilsonia rufinucha*. Although it is possibly identical with *G. milligani*, described by Linton from *Crocethia alba*, the type material of this species is fragmentary and in such poor condition that it is of little value for comparison. The authors therefore provisionally name their specimens as a new species, *Gyrocoelia pagollae*, it being quite distinct from the cestode described by Baer as *G. milligani*. The rostellum of *G. pagollae* is armed with 66 hooks arranged in a zig-zag row; the strobilae are dioecious with no evidence of female structures in male strobilae although the female proglottides are provided with well developed cirrus sacs and rudimentary sperm ducts. It is conceivable that a strobila could function as a male at one time and a female at another should all but the very young proglottides become detached and a new strobila form. s.w.

(247j) In a survey of parasitism in Korean and United Nations personnel (of whom more than 90% were American), Lesser found that 264 of 268 of the former and 135 of 601 of the latter harboured helminths. *Trichuris*, *Ascaris* and hookworm were the most common and were the only helminths found in the UN personnel. *Trichostrongylus* sp., *Clonorchis sinensis* and *Metagonimus yokogawai* occurred in 23.1%, 12.2% and 1.9% of the Koreans respectively. Other helminths were occasionally found. s.w.

(247k) Nagaty gives descriptions and drawings of five trematodes from fish in Egypt of which four are new. *Gyliauchen volubilis* n.sp. occurred in *Pseudoscarius harid* and *Amphacanthus sigan*; it resembles *G. papillatus* most closely but differs in the more posterior position of the ovary, the greater development and extent of the vitellaria, in the convolutions of the

prepharynx which are longer, more voluminous and of constant disposition, and in the greater development of the excretory protuberance. *Bianium tetrodontis* n.sp. from *Tetrodon reticularis* is most nearly related to *B. plicatum* but differs from it in a number of morphological characteristics including the smaller size and ovoid shape, the lack of spines or scales, the position of the acetabulum either at mid-body level or more posteriorly and the size of the pharynx which is as large as the oral sucker. *Cainocreadoides serrani* n.g., n.sp. was collected from *Serranus* sp. and *Lethrinus nebulosus*. The new genus may be differentiated from *Cainocreadium* by the oblique testes, multilobed ovary, muscular metaterm and elongate pharynx. *Hamacreadium epinepheli*, previously considered by Nagaty to be a synonym of *H. mutabile*, is transferred to *Cainocreadoides* as a new combination. *Helicometra boseli* n.sp., from *Holocentrus samara*, differs from all known species of the genus in that the cirrus sac extends well behind the acetabulum. Specimens of *Apharyngogyliauchen callyodontis*, which occurred in *P. harid*, differ from Yamaguti's original description in body size, size of the suckers, and size, shape and position of the ovary. s.w.

(247l) Frick *et al.* tested Abbott's Insect Repellent Cream (E4856) for the protection it would give against cercariae of *Schistosoma japonicum*. Groups of mice were exposed to cercariae 6, 12 and 24 hours after application of the cream and these mice had significantly fewer schistosomes than the controls four to five weeks later. The effectiveness of the cream was lost rapidly after 24 hours. Although protection was not absolute a large number of the mice exposed within 12 hours of the application of the cream were completely protected. There was no irritating effect. s.w.

(247m) Campbell & Todd identify as *Thysanosoma actinioides* portions of strobila obtained post mortem from a lamb in Dodge County, Wisconsin. This is the first record of this tapeworm in a native Wisconsin sheep. This brings the total number of records in mid-western and eastern areas to five, indicating that *T. actinioides* is not a parasite strictly confined to the West. s.w.

(247n) *Urinatrema aspinosum* n.sp., collected by Schiller from the urinary bladder of *Hexagrammos superciliosus*, is described and illustrated. There was considerable variation in body size, gravid specimens ranging from 3.23 mm. to 6.0 mm. in length; the testes varied in shape from slightly irregular to deeply indented and the size of the internal organs appeared to be roughly proportional to the length of the body. The absence of spines on the body differentiates the new species from *U. hispidum*, the genotype and only other known species. s.w.

(247p) Wells examined 224 urine specimens and 118 stool specimens from semi-nomadic men of mixed Kurdish and Arabic descent in the vicinity of Urfa. No *Schistosoma haematobium* or *Trichostrongylus* were demonstrable. *Ascaris* and *Trichuris* occurred in 68% and 72% respectively. *Taenia* eggs, presumably *T. saginata*, occurred in 20%. s.w.

(247q) Of the four trematodes described in this paper, one is new. *Bucephalus heterotentaculatus* n.sp. was collected from the intestine of *Scomberomorus sierra*; it differs from all known species of the genus in the details of the tentacles which are remarkably heterogeneous. *Ciula dorsalis* is a new host for *B. introversus* and *Sarda orientalis* and *Scomberomorus* sp. are both new hosts for *Bucephaloides cybii*. This is the first report of *B. cybii* in the Western hemisphere and of *Bucephalus varicus* from the Pacific coast of Mexico. s.w.

(247r) Burton describes *Ascocotyle leighi* n.sp. from chicks which had been infected experimentally with metacercariae from the conus arteriosus of *Mollienesis latipinna*. *A. leighi* may be readily differentiated from all other species of the genus by the number of spines in the oral coronet (24 to 26 in each of two rows). Examination of a number of fish-eating birds in the neighbourhood failed to reveal the natural definitive host. The metacercaria appears to be strictly specific to *Mollienesis* and limited to the conus arteriosus. s.w.

(247s) The annual incidence of microfilariae of *Ornithofilaria* sp. in immature *Branta canadensis interior*, wintering at a game refuge in Illinois, appears to vary between 19% and 29%. *Sarconema eurycerca* microfilariae occurred in geese five to eight months old and the adults of this species were found in the heart muscle. s.w.

(247t) Voge & Rausch collected eleven specimens of *Shipleya inermis* from seven dowitchers (*Limnodromus* spp.). These specimens agree well with Fuhrmann's original description and, with the exception of the testis location, with Baer's description. The authors describe separately the individuals obtained from each host; they found no evidence to support Baer's observations that *S. inermis* is hermaphrodite, all their specimens being entirely male or entirely female. They emend the generic diagnosis accordingly and discuss the relationships of *Shipleya* and *Infula*. s.w.

(247u) Madsen *et al.* examined blood films from 27 adult work elephants in Thailand, near the Burma border. Of these 21 showed microfilariae although in some cases as many as six slides were examined before a microfilaria was found. As no adults were available no attempt at identification was made but a brief description of the microfilaria is given. s.w.

248—Journal of Pathology and Bacteriology.

- a. URQUHART, G. M., 1956.—“The pathology of experimental fascioliasis in the rabbit.” 71 (2), 301-310.

(248a) Urquhart describes and illustrates by a series of photomicrographs the pathological changes in the liver of rabbits two, three to seven and eight weeks after experimental infection with cercariae of *Fasciola hepatica*. He finds that the characteristic cirrhosis is due to (i) the healing of the infarcts and migration tracts caused by the young worms, (ii) chronic cholangitis resulting from the presence of adult worms, (iii) proliferative changes in connective tissues and on the periphery of the portal and healed tracts and granulomatous lesions caused by the presence of fluke eggs in tissues. Biliary tract obstruction does not play any part in the production of the hepatic cirrhosis. An unexplained feature was the frequent plugging of small bile-ducts by single fluke eggs. The livers of all the rabbits, except those examined only two weeks after infection, showed severe fibrinous peritonitis which was associated with acute hepatitis from the parasites' intrahepatic migrations. R.T.L.

249—Journal of the Royal Army Veterinary Corps.

- a. BICKNELL, S. R., CLABBY, J., DOWLING, M. A. C. & HUGHES, C. M., 1956.—“An experiment in the control of canine filariasis.” 27 (1), 6-17.

(249a) At least 55% of the Army guard dogs in Singapore have *Dirofilaria immitis*. Forty-nine dogs were given a course of banocide tablets (400 mg. daily) for five days followed by caricide tablets (400 mg. daily) for five days, but the blood of 43 of the dogs still remained positive and there were side effects in nearly 50%. Parenteral anthiomaline and antimosan were tried but the side effects precluded their further use. It is stated that although none of the drugs gave entirely satisfactory results, those administered orally merit trial as prophylactics. The small curative effect of the piperazine compounds can be attained with about one fifth of the usual dose if given during a ten-day period instead of three to four weeks. The local vector is *Mansonia uniformis*. R.T.L.

250—Journal of Tropical Medicine and Hygiene.

- a. BELL, S., 1956.—“The Ameru people of Kenya. A medical and social study, Part IX: Ascariasis, taeniasis, ancylostomiasis. Conclusion.” 59 (6), 121-133.
b. WOLF, J., 1956.—“Patent omphalo-mesenteric duct associated with *Ascaris lumbricoides* infestation.” 59 (6), 134-138.
c. WATSON, J. M. & KERIM, R. A., 1956.—“Observations on forms of parasitic pharyngitis known as ‘halzoun’ in the Middle East.” 59 (7), 147-154.

- d. STRANSKY, E. & REYES, A., 1956.—"Liver changes in schistosomiasis in children." 59 (8), 184-187.
- e. CONRAN, O. F., 1956.—"Onchocerciasis. A suggestion for mass treatment." 59 (8), 190-191.
- f. FOSTER, D. G., 1956.—"Filariasis—a rare cause of pericarditis." 59 (9), 212-214.
- g. MCCLELLAND, W. F. J., 1956.—"Studies on snail vectors of schistosomiasis in Kenya." 59 (10), 229-242.
- h. CONRAN, O. F. & CONRAN, A., 1956.—"Medical survey of Tonkolili and adjacent valleys, Sierra Leone." 59 (12), 285-294.

(250a) Bell deals with the sex, age and seasonal incidence of ascaris, hookworm and tapeworm among the Ameru. Tapeworm affects especially those engaged in herding cattle and who eat the meat of animals which die. It is almost an occupational hazard of the witch doctor.

R.T.L.

(250c) The term "halzoun" covers two distinct but similar syndromes, viz., pharyngeal fascioliasis due to *Fasciola hepatica* following the consumption of raw liver, and pharyngeal hirudiniasis due to the leech *Limnatis nilotica* following the drinking of raw spring water. The suggestion that the avian fluke *Clinostomum complanatum* may also cause halzoun is dismissed as far as the Republic of Lebanon is concerned. Of the 23 cases now reported from villages and towns in Lebanon, only two were attributable to leeches. It is suggested that the production of halzoun by very young *Fasciola hepatica* may be due to hypersensitivity or to a vasodilator and irritant secretion.

R.T.L.

(250d) Faecal examinations, rectal scrapings and punch biopsy of the liver in 11 Philippine children with schistosomiasis japonica revealed schistosome eggs in the faecal specimens of 7 out of 14, in rectal scrapings from 5 out of 12 and in liver specimens in 11 and one doubtful, out of 14. In five of the cases the liver specimens were positive while the faeces and rectal scrapings were negative. Punch biopsy of the liver is therefore considered to be the most reliable method of diagnosis.

R.T.L.

(250e) Conran has sought to obtain an immediate lethal effect on *Onchocerca volvulus* by injecting, around individual subcutaneous nodules, 1 ml. to 2 ml. of a 1:100 solution of antypol to which hyalase in the proportion of 1,000 units to 100 ml. had been added to increase the penetrative quality of the antypol. The injection of 4 ml. to 5 ml. was also made in the centre of a group of nodules. In three or four months time the nodules will be excised, and if there should then be evidence of the death of the adult worms this one-day treatment would be more satisfactory for mass therapy than the five weekly intravenous injections now followed.

R.T.L.

(250f) A case of pericarditis with massive effusion is reported. The chronically inflamed pericardium was covered with fibrinous exudate containing numerous unidentified microfilariae. It occurred in a part of the French Cameroons where *Wuchereria bancrofti* is extremely rare but *Acanthocheilonema perstans* occurs in over 90% of the population.

R.T.L.

(250g) McClelland deals with the species identification of the fresh-water molluscs, mainly of the Central Nyanza District, on the north side of the Kavirondo Gulf of Victoria Nyanza, and gives a map of those areas of Nyanza Province in which schistosomiasis is most prevalent. *Schistosoma haematobium* is wide-spread in the most heavily populated and best watered parts of the province while *S. mansoni* is confined to labourers from other areas.

R.T.L.

251—Journal of the Washington Academy of Sciences.

- a. YOUNG, R. T., 1956.—"A review of the cestode genus *Echeneibothrium*." 46 (8), 256-265.

(251a) The taxonomy of the 40 species of *Echeneibothrium* so far recorded in the literature is reviewed and a key is given for the 18 species which are considered recognizable. The relation of the genus to other genera is discussed. Young does not follow Baer (1948) in splitting *Echeneibothrium* into the three genera *Echeneibothrium*, *Rhinobothrium* and *Caulobothrium*.

shinobothrium burgeri, *R. cancellatum*, *R. ceylonicum*, *R. insignia*, *R. flexile*, *R. longicolle*, *R. maculatum*, *R. palombii*, *R. rankini*, *R. shipleyi*, *Bothriocephalus sphaerocephalus* and *B. tumidulus* are transferred to *Echeneibothrium*. *Tiarabothrium javanicum* is renamed *Echeneibothrium ornelli* nom. nov. The following are synonyms: *E. minimum* of *E. dubium*, *E. tobigei* of *E. longicolle*, *E. walga* of *E. flexile* and *E. simplex* of *Anthobothrium variabile*. *E. rankini* is probably identical with *E. shipleyi* and *Tritaphros retzii* with *Trilocularia gracilis*. *E. affine*, *E. austrinum*, *E. ceylonicum*, *E. gracile*, *E. insignia*, *E. julievansium*, *E. maculatum*, *E. myliotatis-aquilae*, *E. myzorhynchum*, *E. sphaerocephalum* and *Discobothrium fallax* are relegated to species inquirendae. The validity of *Discobothrium* is considered questionable. R.T.L.

52—Karakulevodstvo i Zverovodstvo.

- a. DUBNITSKI, A. A., 1956.—[Studies in the developmental cycle of the nematode *Skrjabinigylus nasicola*—a parasite affecting the frontal sinus of fur bearers of the marten family.] 9 (1), 59–61. [In Russian.]
- b. LYUBIMOV, M. P., 1956.—[Enzootic echinococcosis of deer bred for pantocrine at the Shebalino State Farm for breeding deer.] 9 (2), 54. [In Russian.]
- c. GLUSHNEV, M. P., 1956.—[The berry of the bilberry as an anthelmintic.] 9 (2), 56–57. [In Russian.]

(252a) *Skrjabinigylus nasicola* larvae from faeces of Mustelidae were able to infect *Agriolimax reticulatus*, *Zenobiella rubiginosa* and *Cochlicopa lubrica*. In *A. reticulatus* the first moult was after 7 to 8 days and the second after 15 to 17 days. The infective larva, in the cyst, measured 0.793–0.862 mm. In *Lutreola vison*, fed on infected *A. reticulatus*, mature worms developed in 18 to 25 days. G.I.P.

(252c) When arecolin is unobtainable, fresh or preserved berries of *Vaccinium uliginosum* can be used for cestode infections in foxes. When 150–160 gm. of fresh berries were given with the food, large numbers of cestodes were passed, while 50 gm. of the preserved berries were also effective against [unspecified] nematodes in six fox cubs. G.I.P.

253—Leaflet. United States Department of Agriculture.

- a. LUND, E. E., 1956.—“Blackhead of turkeys and chickens. How to control it.” No. 404, 8 pp.

254—Maroc Médical.

- a. BERTRAND, J. L., ACQUAVIVA, R., BLAVIGNAC, F. & THEVENOT, C., 1956.—“Compression médullaire par échinococcose arachnoidienne.” 35 (371), 320–324.

255—Médecine Tropicale.

- a. BLANC, M. & D'AUBENTON, F., 1956.—“Observations préliminaires relatives à une campagne de lutte contre l'onchocercose. Action de quelques insecticides sur les poissons.” 16 (1), 93–100.

(255a) The authors have investigated the toxicity of lindane and D.D.T. to fish as a preliminary to the initiation of large scale campaigns against the simuliid vectors of *Onchocerca*. They found lindane to be extremely poisonous to the fish even at concentrations lower than those effective against simuliids. D.D.T. was better tolerated by the fish even at fairly high dosage rates. Further work, carried out in the locality where the control campaigns are proposed, is necessary in order that the direct and indirect effects on the fauna may be studied as many of the fish are of great importance in local economy. S.W.

256—Medical Journal of Australia.

- a. HEMMING, G. R., 1956.—“Respiratory complications of *Ascaris* infestation in Fiji.” 43rd Year, 1 (12), 501-502.
- b. BLANCH, M., 1956.—“Eosinophilia with hepatomegaly.” 43rd Year, 2 (5), 184-185.

(256a) The high incidence of apparent asthma among Indian children in Suva, Fiji, is associated with heavy ascaris infection. The condition is relatively rare in Fijians. R.T.L.

(256b) Two children, seen at Queen Victoria Hospital, Melbourne, had enlarged livers and a high eosinophilia, viz., 60% and 67.5% respectively. The faeces were negative for helminth eggs. As both were dirt eaters it is suggested that these cases were probably due to infection with larvae of a dog ascarid, probably *Toxocara canis*. R.T.L.

257—Medical Journal of Malaya.

- a. SANDOSHAM, A. A., 1956.—“Hazards of importation with special reference to helminths.” 11 (1), 33-38. [Discussion pp. 38-39.]

(257a) After summarizing the various factors such as climate, physical surroundings, sanitary and food habits of the inhabitants, the distribution of intermediate hosts and the immigration of foreign peoples which affect the distribution of helminths in any given territory, Sandosham is of opinion that there is reassuring evidence that the two helminth diseases, schistosomiasis and filariasis, which were recently brought into Malaya are unlikely to become endemic. None of the indigenous Mollusca have been found to be susceptible to *Schistosoma haematobium* or *S. mansoni* while species of *Oncomelania*, responsible for the spread of *S. japonicum*, are absent. There are several species of *Aedes* in the country which may become carriers of *Wuchereria malayi* but as diethylcarbamazine can be used to reduce the microfilariae in the peripheral circulation and prevent their transmission, immigrant Fijians are periodically examined and those infected are being treated. R.T.L.

258—Medical Press. London.

- a. NEWSOME, J., 1956.—“Resistance to helminth infections.” 235 (12), 249-250.

(258a) Newsome discusses the importance of human immunity to common helminth infections and briefly describes its mechanism. Since helminths, unlike bacteria, do not multiply in the body and the immunity seldom survives after the helminths have been removed, he suggests that immunity is better described as a partial variable resistance which has obvious value to both helminth species and host. Since effective treatment will probably reduce or destroy pre-munition, a more cautious attitude to anthelmintic treatment is suggested. Where public health services are efficient and well supplied with money the loss of immunity after treatment may perhaps be disregarded. But in under-developed areas the people may often be left to rely on their resistance to helminth diseases, and the available money be better used on basic public health necessities such as drainage and education. While serious cases must receive treatment, exception is taken to the practice of treating all laboratory-diagnosed worm infections in endemic areas with intent to cure, and it is suggested that symptomatic treatment, already used with some success, is often preferable and does not reduce the patient's resistance to inevitable reinfection. The danger in endemic areas of ambitious control schemes which do not entirely succeed or are allowed to decay is stressed. These arguments are admitted to be general and not applicable to all individuals and circumstances, but a plea is put forward that those working in territories where heavy helminth infection is common should remember the value to the individual of his slowly acquired resistance. Such second thoughts may sometimes prevent fatalities due to the energetic treatment of unimpressive helminth infections in weak subjects.

D.L.H.R.

9—Medycyna Weterynaryjna.

- a. OGIELSKI, L., 1956.—“Przypadek wapnienia włóśni wewnątrz torebki.” [An instance of calcification of *Trichinella* inside the capsule.] 12 (2), 92–93.
- b. ZARZYCKI, J., 1956.—“Badania histologiczne nad zachowaniem się glikogenu w tkance mięśniowej poprzecznie prążkowanej przy zarażeniu włóśniami.” 12 (6), 328–332. [English & Russian summaries p. 332.]
- c. BORKOWSKI, B., 1956.—“Związek między budową i działaniem roślinnych środków robakobójczych.” 12 (6), 361–366.

(259b) Samples of the diaphragms of white mice with experimental trichinellosis were examined for glycogen from the fifth day onwards after infection. Larval entry into the muscle fibres was accompanied by granulation changes and followed by an increase in glycogen. On the 11th day the glycogen began to decrease and on the 13th day was seen to accumulate within the larva around its periphery under the cuticle. On the 20th to 23rd day, with the formation of the capsule, it completely disappeared from the fibres, but the glycogen stored in the larva was still present after 12 months. G.I.P.

(259c) Borkowski supports Pfeiffer & Wohlmuth's opinion that the anthelmintically active part in their two angelica lactones was the unsaturated ketone group. He reviews anthelmintics of plant origin, classifying the compounds according to type. He discusses their anthelmintic activity in relation to their structure and shows that a large number of plant anthelmintics contained the unsaturated ketone group. G.I.P.

10—Mikroskopie. Vienna.

- a. PIRINGER, W. & PIRINGER, E., 1956.—“Photostudie über die Entwicklung der Eier von *Ascaris lumbricoides*.” 10 (9/10), 349–352. [English summary p. 352.]

(260a) When faecal samples are collected and preserved during warm weather, eggs of *Ascaris lumbricoides* undergo some development. To assist in the recognition of the different phases, from the commencement of segmentation to the filariform larva, ten photographs are reproduced and these are described in the text. R.T.L.

11—Miscellaneous Publications. Rhode Island Agricultural Experiment Station.

- a. TARJAN, A. C. & CHEO, P. C., 1956.—“The nematode screening program of the University of Rhode Island.” No. 47, 27 pp. [Mimeographed.]

(261a) Chemicals are listed in tabular form to indicate their efficacy as nematocides. Six test methods are employed: the contact test in which living nematodes are immersed in an aqueous preparation; the ovicide test in which eggs of the root-knot nematode, *Meloidogyne incognita*, are immersed in aqueous preparations; a therapy test in which the chemicals are sprayed on to the leaves of infected plants; a second therapy test where the chemicals are added to the soil in which nematode-infected plants are growing; a third therapy test in which the chemicals are injected into the main stem of infected plants; a repellency test where the chemicals are applied as aqueous drenches to the roots of healthy seedlings which are then exposed to infection from root-knot nematodes. A method of coding is adopted to show the effect of the various chemicals on the nematodes, in each test procedure. H.R.W.

12—Mitteilungen für die Schweizerische Landwirtschaft.

- a. GRAF, A., 1956.—“Sind wir im Begriffe, den Kartoffelnematoden (*Heterodera rostochiensis*) in die Schweiz einzuschleppen?” 4, 60–63.

(262a) *Heterodera rostochiensis* is not known to be common in Switzerland. Graf describes the pest, its life-history, its effect on the crop, and its distribution in Europe. Examination of 249 loads of imported seed potatoes revealed that 21 contained cysts of *H. rostochiensis*; these loads were seized and the potatoes were washed to remove the cysts. The need for adequate inspection of seed potato growing areas is stressed. It is deduced that *H. rostochiensis*

must have been introduced into Switzerland. Farmers are advised not to grow potatoes more frequently than once in four years, and to report if they suspect that the eelworm is present on their land.

J.J.

263—Monatshefte für Veterinärmedizin.

- a. LÖLIGER-MÜLLER, B., 1956.—“Wenig bekannte Parasiten der Haustiere.” 11 (10) 229–230.
- b. BERGMANN, G. & SIELAFF, H., 1956.—“Eine Vergleichsstudie der zur Feststellung von Trichinen bisher entwickelten Trichinoskope.” 11 (15), 348–350.

(263a) *Gongylonema pulchrum* and *Acuaria hamulosa* are seldom seen in central Europe but they have recently been found in Germany and are briefly described.

R.T.

(263b) Having tested four kinds of trichinoscopes and two microscopes for the detection of intramuscular trichinae of different stages, Bergmann & Sielaff recommend magnification powers of 50 and 80–100 times, illumination by an incandescent lamp of 12 V. and 100 watt with automatic control of the brightness according to the magnification, and a visual field large enough to cover the whole preparation under low magnification.

M.McC

264—Monthly Agricultural Report. Ministry of Agriculture, Northern Ireland.

- a. ANON., 1956.—“Worms in sheep and cattle.” 30 (11), 331–333.

265—Nature. London.

- a. LEWIS, D. J., 1956.—“Biting times of parous and nulliparous *Simulium damnosum*.” [Correspondence.] 178 (4524), 98–99.
- b. SEN, P., 1956.—“*Anopheles hyrcanus* as a vector of filariasis in West Bengal.” [Correspondence.] 178 (4536), 749–750.
- c. NYBERG, W. & ÖSTLING, G., 1956.—“Low vitamin B₁₂ concentrations in serum in fish tapeworm anaemia.” [Correspondence.] 178 (4539), 934–935.
- d. THOMAS, J. D., 1956.—“Life-history of *Phyllodistomum simile* Nybelin.” [Correspondence.] 178 (4540), 1004.
- e. FAIN, A., 1956.—“*Coenurus of Taenia brauni* Setti parasitic in man and animals from the Belgian Congo and Ruanda-Urundi.” [Correspondence.] 178 (4546), 1353.

(265a) Of 179 *Simulium damnosum* caught during the mornings in the Tonkolili valley, Sierra Leone, during the latter half of December, 60.9% were parous and 12.3% contained developing *Onchocerca* larvae while of 202 specimens caught in the afternoons, 25.2% were parous and 5.9% contained *Onchocerca* larvae.

R.T.

(265b) *Anopheles hyrcanus* has now been found to be frequently a natural vector of *Wuchereria bancrofti* in West Bengal.

R.T.

(265c) In the serum of patients with *Diphyllobothrium latum* anaemia the range of vitamin B₁₂ was about the same as that of cases of pernicious anaemia and was less than 50 $\mu\text{g}/\text{ml}$. In controls with various other diseases it was 180 to 964 $\mu\text{g}/\text{ml}$. with an average of 561 $\mu\text{g}/\text{ml}$. while in normal individuals it ranged from 70 to 100 $\mu\text{g}/\text{ml}$. of serum.

R.T.

(265d) *Phyllodistomum simile* has been collected, for the first time in Britain, from *Salmo trutta* in mid-Wales. The daughter sporocysts which occur in *Sphaerium corneum* contain styletted aphyaryngeal cercariae with six penetration gland cells and a flame cell formula 2 (4+4)+(4+4+4+4). The metacercariae, which encyst precociously in the sporocysts were used successfully to infect *Salmo trutta* in the laboratory.

R.T.

(265e) *Taenia brauni* is very common in dogs and jackals in the Ruanda-Urundi area and Ituri region in Eastern Congo. The coenurus occurs in *Rattus r. rattus*, *Otomys irroratus vulcanius*, *Dendromus pumilio lineatus*, *Grammomys surdaster*, *Lemniscomys striatus*, in *Cercothecus mitis doggetti* and in man. In three rats and in one ape the cysts were located in the brain. Between 1948 and 1956 Fain saw eight cases in man, of which seven were in children eleven months to five years old, and one in a boy 14 years of age. These coenuri were all subcutaneous. Fain is of opinion that the coenurus reported by Taramelli & Dubois from under the skin of a native of the Belgian Congo and the four South African cases of cerebral coenuriasis attributed to *Taenia multiceps* by Becker & Jacobson in 1951 were coenuri of *T. brauni*. R.T.L.

266—Nematologica.

- a. VAN DER LINDE, W. J., 1956.—"The *Meloidogyne* problem in South Africa." 1 (3), 177-183.
- b. GILLARD, A. & BRANDE, J. VAN DEN, 1956.—"Influence de la lumière sur le développement du nématode des racines, *Meloidogyne* sp. (Résultats préliminaires)." 1 (3), 184-188.

(266a) The author gives an outline of the results of preliminary work on various aspects of the important problem of root-knot disease in South Africa. The species of *Meloidogyne* found so far include *M. hapla*, *M. arenaria* subsp. *thamesi*, *M. javanica* and nine populations of *M. incognita* var. *acrita* from different localities, which differ from each other in host preferences. On *Gossypium hirsutum* two populations fail to penetrate the roots, six populations penetrate but do not reproduce and one produces only very few egg sacs. It is thought that it will be possible to differentiate between the forms of *acrita* by their host reactions, especially their development on *Panicum maximum*, *Pennisetum glaucum* and *Sorghum alnum*. In a search for resistant plants numerous host tests were carried out with populations of the different species and races of *Meloidogyne* built up from single egg masses. The results are given in tables and include nearly 50 new host records. Of a number of grasses tested, the Ermels strain of *Eragrostis curvula* is immune to all five strains of *M. incognita* var. *acrita* tested as well as to *M. javanica*, *M. hapla* and *M. arenaria* subsp. *thamesi*, but other strains of this grass are susceptible. In *Crotalaria spectabilis* also none of the above named nematodes reproduced, although they did penetrate the roots. Crop rotations are discussed on the basis of the results of host tests. In South Africa seed potatoes must officially be 100% free from root-knot nematodes. Experiments on cold storage of the tubers to destroy the nematodes in them were carried out since soil fumigation has given unsatisfactory results. In seed potatoes kept at 31°F. nematode larvae and adults are killed in a month but some eggs hatch even after six months' cold storage. Storage at 34°F. has similar results but a greater proportion of eggs are viable. Nematode-infested peach trees with their roots kept in moist straw were fumigated with methyl bromide at 2½ lb. per 1,000 cu. ft. at 65°F. for varying periods and then grown in sterilized soil for nine months. The new roots were infested in trees treated for four and six hours and clean in trees treated for eight hours, but three out of 15 of these trees were killed. Treatment for 12 hours killed all trees. Ethylene dibromide is found to be a more effective soil fumigant than D-D mixture on a price basis. M.T.F.

(266b) Preliminary experiments were carried out to discover whether the development of root-knot nematodes (*Meloidogyne* sp.) is influenced when the host plant is exposed to light of different wave-lengths. Tomato plants inoculated with *M. arenaria* were immediately exposed to light from red, green, blue or white lamps. After five to six weeks counts were made of galls and female nematodes in the roots. The results, which are considered as provisional because small numbers of plants were used, showed more galls than mature females in plants exposed to red light and to white light and the numbers in the red plants were far above those in any other plants. In a second experiment where the plants were not exposed to the coloured lights until four days after inoculation there were no obvious differences between the treatments. It is suggested that the light does not influence the nematodes once they are within the roots and that red light favours the attraction of nematodes to the roots, perhaps by influencing the quantity or nature of the root diffusates. M.T.F.

266—Nematologica (cont.)

- c. DUNNING, R. A., 1956.—"Beet stem eelworm." 1 (3), 189-191.
- d. SLOOTWEG, A. F. G., 1956.—"Root rot of bulbs caused by *Pratylenchus* and *Hoplolaimus* spp." 1 (3), 192-200. [Discussion pp. 200-201.]
- e. OOSTENBRINK, M., s'JACOB, J. J. & KUIPER, K., 1956.—"An interpretation of soil crop rotation experiences based on nematode surveys and population studies." 1 (3), 202-222. [German summary pp. 213-214. Discussion p. 215.]
- f. MINDERMAN, G., 1956.—"New techniques for counting and isolating free living nematodes from small soil samples and from oak forest litter." 1 (3), 216-226.
- g. WALLACE, H. R., 1956.—"The seasonal emergence of larvae from cysts of the beet eelworm *Heterodera schachtii* Schmidt." 1 (3), 227-238.

(266c) Seedling beet and mangolds attacked by *Ditylenchus dipsaci* show typical stunting and malformation. Multi-headed beet may result and in the autumn the roots may be cankered. The race of stem eelworm attacked oats, rye and onions. Eelworms from cankered material attacked sainfoin, alsike and wild white clover. The red clover race of *D. dipsaci* attacked but did not reproduce. In the field very few beet plants were attacked, even when following severe infestations on a previous crop. J.B.

(266d) In Holland, bulbs and corms suffer from nematode-caused root rot in the peaty and sandy bulb growing areas. Narcissi are worst affected although tulips, hyacinths, gladioli, crocuses and scillas also suffer. *Pratylenchus penetrans* is the primary cause but the fungus *Cylindrocarpon radiculicola* plays a secondary role. Small nematode populations cause severe root rot because of the restricted root system. Lilies-of-the-valley are attacked by *P. pratensis* which does no damage to narcissus. Lilies-of-the-valley are attacked in Kennemerland by *Pratylenchus* sp. or *Hoplolaimus uniformis* and *Cylindrocarpon radiculicola* is also a secondary parasite. *P. penetrans* may exist as a number of races. Root rot is not transmitted by detached bulbs as the rot is limited to roots. Infested soils are fumigated with D-D mixture which controls the nematodes. *Pratylenchus* populations are diminished by growing African marigold (*Tagetes erecta*) on infested soil. J.B.

(266e) The nematode populations in various cultivated soils in Holland were investigated. The nematodes included members of the genera *Heterodera*, *Hoplolaimus*, *Meloidogyne*, *Paratylenchus*, *Pratylenchus*, *Rotylenchus* and *Tylenchorhynchus*. Data are presented correlating the variation in numbers of different species with different crop rotations. For instance, high populations of *Pratylenchus* are correlated with decreased crop yields. It is suggested that carefully worked-out rotations may lessen crop losses. There are six tables, one text figure and two plates. J.B.

(266f) The nematode populations of small samples of soil and forest litter can be investigated quantitatively by four methods. (i) The soil sample is treated with hot cotton blue or acid fuchsin lactophenol on a filter. After three to five minutes the stain is sucked off and the sample washed in lactophenol and then transferred to a counting dish from which the nematodes are picked by hand. This method is very slow but the next is rather quick. (ii) Soil samples are suspended in strong magnesium sulphate solutions and then centrifuged. The nematodes float and are decanted and may be stained as in method (i) and so picked up, mounted and identified. (iii) Nematodes are isolated from forest litter by placing the sample on a copper gauze in a beaker of water and shaking the beaker for one minute every five minutes for 24 hours. About 80% extraction is obtained. (iv) The number of nematodes still present in the litter after (iii) is determined by treating the litter with a mixture of 6% hydrogen peroxide with some ammonia and then staining the resulting bleached material with cotton blue or acid fuchsin lactophenol. The nematodes can then be seen and dissected out if necessary. J.B.

(266g) Field experiments during 1954 and 1955 showed that there was a high rate of larval emergence from cysts in the spring and a relatively low emergence rate in the summer. It is suggested that low soil moisture content was probably the chief factor inhibiting

266—Nematologica (cont.)

- h. GOODEY, J. B., 1956.—“Observations on species of the genus *Iotonchium* Cobb, 1920.” 1 (3), 239–248.
- i. SEINHORST, J. W., 1956.—“The quantitative extraction of nematodes from soil.” 1 (3), 249–267.
- j. JONES, F. G. W. & MORIARTY, F., 1956.—“Further observations on the effects of peas, beans and vetch upon soil population levels of pea root eelworm, *Heterodera göttingiana* Liebscher.” 1 (3), 268–273. [German summary p. 273.]
- k. SIMON, L., 1956.—“Die Beleuchtung der Probeschalen bei der Untersuchung auf cystenbildende Nematoden.” 1 (3), 274.
- l. GRAINGER, J., 1956.—“The control of *Ditylenchus dipsaci* on oats.” 1 (4), 277–282.

emergence in the summer. Field and laboratory experiments indicate that larval emergence is greatly inhibited when the pressure deficiency in the soil exceeds 150 cm. water. In four types of soil examined at least 50% of the cyst population occurred within crumbs, and the rate of larval emergence from these cysts was very low. H.R.W.

(266h) *Iotonchium cephalostriatum* Meyl, *I. mycophilum* Meyl and *I. macrospiculatum* (Meyl) J. B. Goodey are critically examined and redescribed. They conform to the characters of *Iotonchium* set out by T. Goodey (1953). Additional characters of the genus are: (i) that the pre-adult male larva is precocious in having spicules and a fully developed gonad but no bursa; (ii) the radially symmetrical head of the larval male becomes trilobed and flattened dorso-ventrally at the final moult; (iii) no ducts from oesophageal glands can be seen, in either sex, to join the lumen of the oesophagus. The salient points are figured. J.B.G.

(266i) Two slightly different pieces of apparatus are described whereby nematodes can be separated from soil by elutriation. A soil suspension in water is allowed to sediment against a slow upward current of water. After elutriation the nematodes are further separated by sieving. This is carried out either by repeated sieving through one sieve or through a bank of sieves. Data are presented on the relationships between the size of nematode, diameter and pore size of sieve, and numbers of nematodes retained by the sieves. Other methods for the final separation of nematodes from small quantities of soil particles are described and for the reduction of volume of eelworm suspension. The methods are fully illustrated. J.B.G.

(266j) In experiments conducted in microplots and small garden plots, marked rises in the cyst and egg populations of pea-root eelworm (*Heterodera göttingiana*) were caused by growing peas. Vetch doubled the number of cysts but gave only small increases in eggs. Field beans nearly doubled the number of cysts but barely maintained the egg population. Small increases in cyst numbers and decreases in eggs were caused by Longpod and Windsor beans. No symptoms of pea “sickness” appeared in 1955 despite the high initial eelworm populations in the plots. This may have been due to the moist, cool weather or to the use of nitrogenous fertilizer. F.G.W.J.

(266k) Simon describes a method of illuminating sample dishes containing water and floating material from soil for the identification of *Heterodera* cysts. Light from a 150 watt lamp is directed on to a matt white screen placed vertically at right angles to the sample dish. The screen is larger than the dish and the light reflected from it illuminates the sample evenly and without shadows. The operator can adjust the distance of the dish from the screen to his own requirements. This type of illumination minimizes eye strain and the yellowish light is good for distinguishing cysts of *H. rostochiensis*. M.T.F.

(266l) Tulip root of oats, due to *Ditylenchus dipsaci*, was controlled to some extent in the field by the application of 40–55 gal. per acre of a 0.1% solution of mercuric chloride to the soil, followed by immediate mixing of the soil surface. The application was made after the oats had been sown. Results are set out in tabular form. Mercuric chloride breaks down to metallic mercury in the soil and it is suggested that the mercury vapour is responsible for the control obtained. J.B.G.

266—Nematologica (cont.)

- m. FORSTER, A. R., 1956.—“The development of *Heterodera rostochiensis* and *Meloidogyne incognita* in cross-grafted solanaceous plants with different susceptibilities.” 1 (4), 283–289. [German summary p. 289.]
- n. FENWICK, D. W., 1956.—“The breakdown of potato-root diffusate in soil.” 1 (4), 290–302. [German summary p. 301.]
- o. ANDERSEN, S., 1956.—“Collection of cysts of *Heterodera major* and estimation of the cyst content.” 1 (4), 303–306.
- p. PEACOCK, F. C., 1956.—“The reniform nematode in the Gold Coast.” 1 (4), 307–310.
- q. MEYL, A. H., 1956.—“Beiträge zur freilebenden Nematodenfauna Brasiliens, I. Acht neue Nematodenarten der Überfamilie Dorylaimoidea.” 1 (4), 311–325. [English summary p. 324.]

(266m) Forster describes two experiments on the susceptibility of cross-grafted plants to nematode attack. In the first, plants consisting of *Solanum nigrum* scion on tomato (*Lycopersicum esculentum*) rootstock and tomato scion on *Solanum nigrum* rootstock were grown in soil to which larvae of *Heterodera rostochiensis* were added. The larvae developed normally in the tomato roots and failed to develop, as is normal in *Solanum nigrum* roots, irrespective of the scion. In the second experiment *Lycopersicum peruvianum* and tomato were cross-grafted and the plants exposed to infestation by larvae of *Meloidogyne incognita* to which *L. peruvianum* is resistant and tomato is susceptible. The *L. peruvianum* rootstocks behaved normally in being highly resistant to the nematode whether the scion was *L. peruvianum* or tomato. But tomato rootstocks having *L. peruvianum* scions produced significantly fewer mature females and egg masses of *M. incognita* than where the scion was tomato. It is suggested that an inhibiting factor is transmitted down from the resistant *L. peruvianum* scion to the tomato rootstock, but in all the other grafts there was no evidence of transmission of susceptibility or resistance from scion to stock.

M.T.F.

(266n) From an investigation on the persistence of root diffusate of the potato in the soil as shown by its effect on the cyst contents of *Heterodera rostochiensis*, Fenwick finds that the breakdown is less rapid in sand, gravel or clay than in horticultural peat. In a medium grade loam 90% of the active agent was lost in four days. When repeated applications were made to loam the breakdown curves were successively steeper. Experiments are described which suggest that some micro-organism utilized the diffusate. Fenwick concludes that the use of diffusate or its active principle is not a practical method of controlling potato-root eelworm in the field.

R.T.L.

(266o) The loss of the non-floating cysts of *Heterodera major* may mean a loss of 25% of the eelworm population. To minimize this loss soil must be dried at 110°C. to 120°C., before it is washed in a Fenwick can. A strong current of water must be used. The cysts and debris obtained may be transferred to a solution of magnesium sulphate of specific gravity 1.20, and the floating cysts recovered, or they may be dried and cleaned by rolling on a machine. The principle of the machine is described. Cyst contents may be estimated by crushing the cysts and agitating them in water in a plastic flask to produce a suspension of eggs which are counted in a modified McMaster slide.

J.J.H.

(266p) *Rotylenchulus reniformis* occurred in various places on the roots of various plants in the Gold Coast. Measurements of larvae and adults are given. The life-history was completed in 15–22 days. A list of plants acting as susceptible, slightly susceptible and resistant hosts is given, and a heavy attack on tomato is described. Three photographs illustrate the article.

J.B.G.

(266q) Eight new species of the Dorylaimoidea are described and figured. They are: *Dorylaimus paulbuchneri* n.sp., *D. brasiliensis* n.sp., *Aporcelaimus gerlachi* n.sp., *A. paraconicaudatus* n.sp., *Nygolaimus paulbuchneri* n.sp., *Leptonchus multipapillatus* n.sp., *L. paucipapillatus* n.sp., and *Dorylaimoides paulbuchneri* n.sp. A differential diagnosis is not made but the affinities of each are given. The nematodes were collected by Gerlach along the sandy shores of the Brazilian coast.

J.B.G.

266—Nematologica (cont.)

- r. JONES, F. G. W. & MORIARTY, F., 1956.—“A preliminary experiment on the effect of various cereals on the soil population of cereal root eelworm, *Heterodera major* O. Schmidt.” 1 (4), 326–330. [German summary p. 330.]
- s. FENWICK, D. W., 1956.—“The production of sterile viable larvae of the potato root eelworm, *Heterodera rostochiensis*.” 1 (4), 331–336. [German summary p. 336.]
- t. NICHOLAS, W. L., 1956.—“The axenic culture of *Turbatrix aceti* (the vinegar eelworm).” 1 (4), 337–340.
- u. DUDDINGTON, C. L., JONES, F. G. W. & WILLIAMS, T. D., 1956.—“An experiment on the effect of a predacious fungus upon the soil population of potato root eelworm, *Heterodera rostochiensis* Woll.” 1 (4), 341–343. [German summary p. 343.]
- v. DUDDINGTON, C. L., JONES, F. G. W. & MORIARTY, F., 1956.—“The effect of predacious fungus and organic matter upon the soil population of beet eelworm, *Heterodera schachtii* Schm.” 1 (4), 344–348. [German summary p. 348.]
- w. GOFFART, H., 1956.—“Über Nematodensukzessionen bei Zucker- und Futterrüben.” 1 (4), 349–352. [English summary p. 352.]

(266r) The influence of varieties of wheat, barley and oats upon the soil population of cereal-root eelworm were tested in microplots. Oats and barley caused greater increases in population than wheat. The highest population followed barley variety Herta. A slight decline in population occurred after barley variety Kron, and wheat variety Bersée, both of which gave final populations significantly lower than most other cereals tested. Population changes were adequately measured by cyst counts which gave greater precision than egg counts. F.G.W.J.

(266s) Although the larvae of *Heterodera rostochiensis* can be sterilized by immersion in 1:20 solutions of Milton their capacity to invade the roots of potatoes is completely lost. Other compounds tested failed to achieve asepsis or they killed the larvae. However, sterilized and infective larvae can be obtained by placing the eggs, recovered from the cysts, in a 20 volume solution of hydrogen peroxide for eight hours. R.T.L.

(266t) *Turbatrix aceti* was cultured axenically on two different media. Both contained autoclaved liver homogenate prepared from bovine liver and M/15 Sorenson's phosphate buffer (pH7) in a Waring Blender. To one medium was added unheated liver extract prepared in a similar way but Seitz filtered: to the other, chick embryo extract was added. Sterile vinegar eelworms were obtained by the use of hydrogen peroxide and antibiotics. The eelworms multiplied well in both media and were maintained by serial sub-culture. J.B.G.

(266u) In an experiment in microplots to test the effects of a predacious fungus (*Dactylaria thaumasia* Drechsler) and three types of organic matter (leaf mould, compost and chopped cabbage) upon the potato-root eelworm population of the soil, the initial population was low and all treatments were without effect upon the yield of potatoes or the final cyst and egg counts. F.G.W.J.

(266v) An experiment was undertaken in microplots heavily infested with beet eelworm to test the effect of heavy doses of fungus mycelium (*Dactylaria thaumasia* Drechsler) and organic matter (bran) upon the soil population. Both treatments increased yield. The fungus had no effect upon the final cyst population but organic matter caused a significant depression. Neither treatment affected the final egg population. A culture of a second fungus (*Dactylella doedycoides* Drechsler) added to one of the treatments was without obvious effect on yield or final eelworm population. F.G.W.J.

(266w) Over a period of two years Goffart investigated the nematode fauna of sugar-beet and fodder-beet heavily infested with *Ditylenchus dipsaci*. Slices were taken from the beet and the nematodes from portions showing different degrees of decay were extracted and identified. On the surface of the beet he found free-living nematodes of the genera *Eucephalobus*, *Rhabditis*, *Panagrolaimus* and *Dorylaimus*. In healthy tissue there were no nematodes. In rotted tissue which was dry he found *Ditylenchus dipsaci* nearly exclusively, most of them

at the edge of the healthy tissue. This species could form dense white masses and in some circumstances the nematodes would move in procession along definite routes. Tissue which had decayed further contained *Panagrolaimus rigidus*, *Aphelenchoides parietinus* and *Aphelenchus avenae*. As the rotted tissue became wet *P. rigidus* decreased and *Rhabditis brevispina* increased often until it represented 90% of the nematode population. Finally *Diplogaster lheritieryi* took its place in the last stage of decay.

M.T.F.

267—New Zealand Veterinary Journal.

- a. MALONE, P. H., 1956.—“Phenothiazine toxicity.” 4 (3), 125-126.

(267a) No toxicity or photosensitivity was evident in lambs after the daily administration, for five days, of doses of 15 gm., 75 gm. and 120 gm., of phenothiazine of nominal particle size of 3μ and of 0.1μ to 0.6μ (with a median of 0.4μ).

R.T.L.

268—Norsk Landbruk.

- a. ENGER, Ø. & KARBØ, A., 1956.—“Leverikten—en dyr parasitt for husdyrbruket.” 22 (3), 60-62.

(268a) Enger & Karbø report that 4,910 (80%) of 6,137 cattle slaughtered at an abattoir in Norway during 1954 were infected with liver-fluke. Infection was so severe in 3,101 of the animals that the whole liver had to be condemned. The financial loss on the condemned livers is estimated to have been 109,040 kroner (approximately £5,500). Since the average weight of animals with healthy livers was 198.7 kg. and that of those with infected livers 184.4 kg., further losses can be ascribed to liver-fluke, although it cannot be assumed that the whole of the weight loss was caused by the infection.

A.E.F.

269—Parasitology.

- a. RAUSCH, R. & SCHILLER, E. L., 1956.—“Studies on the helminth fauna of Alaska. XXV. The ecology and public health significance of *Echinococcus sibiricensis* Rausch & Schiller, 1954 on St Lawrence Island.” 46 (3/4), 395-419.
 b. KULASIRI, C. & FERNANDO, C. H., 1956.—“Camallanidae parasitic in some Ceylon fish.” 46 (3/4), 420-424.
 c. REES, G., 1956.—“The scolex of *Tetraobothrius affinis* (Lönnberg), a cestode from *Balaenoptera musculus* L., the blue whale.” 46 (3/4), 425-442.
 d. NAJIM, A. T., 1956.—“Life history of *Gigantobilharzia huronensis* Najim, 1950. A dermatitis-producing bird blood-fluke (Trematoda—Schistosomatidae).” 46 (3/4), 443-469.
 e. BEARUP, A. J., 1956.—“Life cycle of *Austrobilharzia terrigalensis* Johnston, 1917.” 46 (3/4), 470-479.

(269a) *Echinococcus sibiricensis* is widely distributed in Eurasia, its north-eastern limit being apparently St. Lawrence Island where *E. granulosus* does not occur. Microtine rodents, especially *Microtus* spp. and *Clethrionomys rutilus*, are its natural intermediate hosts. Although its hydatid occurs in man and rhesus monkeys it rarely produces scolices. It can develop in the liver of the lemming *Dicrostonyx torquatus* but is soon overcome by tissue reaction. The brown lemming *Lemmus sibiricus* is potentially an important intermediate host for it has a wide distribution in Arctic Asia and North America and is an important food of the Arctic fox, the natural definitive host, in which, on St. Lawrence Island, the infection ranges from 40% to 100%. Dogs are also suitable definitive hosts, but in them the incidence of infection on St. Lawrence Island is low. Twenty-six out of 35 Eskimos were positive to complement fixation and Casoni tests with alveolar-type antigen. Radical resection of the infected hepatic lobe is as yet the only satisfactory method of treatment.

R.T.L.

(269b) Camallanidae have not, hitherto, been recorded from Ceylon. Three species are now reported from fish collected from ponds, paddy fields and irrigation reservoirs, viz., *Camallanus anabantis* from *Puntius filamentosus*, *Anabas testudineus*, *Ophicephalus punctatus* and *Rasbora daniconius*; *C. sweeti* from *A. testudineus*, *Clarias batrachus*, *O. punctatus*, *O. striatus*

and *Rasbora daniconius*; and *Procamallanus planoratus* from *C. batrachus*, *O. punctatus* and *O. striatus*. New host records are *P. filamentosus*, *O. punctatus* and *R. daniconius* for *Camallanus anabantis*; *O. punctatus* and *O. striatus* for *C. sweeti* and *O. striatus* for *P. planoratus*. A third-stage larva was found in *O. punctatus* and in *Clarias batrachus*. As the hosts feed chiefly on copepods it is concluded that a second intermediate host is not essential for the infection of the carnivorous species of fish and that infected smaller fish act only as carrier hosts. R.T.L.

(269c) As only the anatomy of the classic type of scolex of *Tetrabothrius* has been described, Rees gives a detailed account of the musculature of the scolex, bothridia and auricles, and of the nervous and excretory systems in the scolex and bothridia of the more developed type which occurs in *T. affinis*. The differences between the two types are all related to the unusual shape of the scolex and the more extensive development of the bothridial muscles. The destructive effect of the attachment of the scolex to the intestinal wall is described and illustrated. R.T.L.

(269d) The morphology and life-cycle of *Gigantobilharzia huronensis* Najim, 1950 are now described in detail and figured. The natural definitive hosts are gold finches, *Spinus t. tristis*, and cardinals, *Richmondia cardinalis*. That chickens and canaries could be infected and that *Physa gyrina*, from the Huron River at Delhi, near Ann Arbor, Michigan, U.S.A., is the intermediate host, was determined experimentally. The cercaria is apharyngeal, furcocercous and brevifurcate and has pigmented eyespots. It causes dermatitis in man. A key is provided for the six species of *Gigantobilharzia*. R.T.L.

(269e) The sea-gull *Larus novae-hollandiae* in the Sydney district is nearly always infected with *Austrotilharzia terrigalensis*. The life-cycle has been followed experimentally in young sea-gulls, budgerigars and pigeons. The intermediate host is *Pyrazus australis*. The cercaria had been tentatively named *Cercaria varieglandis* subsp. *pyrazi* by Bearup in 1955, but as the adults have now been identified this name lapses. Comparison of the adults with Johnston's original description in 1917 shows differences in measurements which are attributed to technique, but in the female there is an oral sucker which is hard to distinguish and according to Johnston is absent. Experimentally the cercariae cause a dermatitis similar to that occurring after bathing in Narrabeen Lagoon where about 4% of *Pyrazus australis* contain bifid-tailed cercariae. R.T.L.

270—Parazitologicheski Sbornik.

- a. DUBININA, M. N. & SMOGORZHEVSKAYA, L. A., 1956.—[On *Reighardia sternae* Dies. (Pentastomida) described as *Squamofilaria macroovata* Serkova (Nematoda).] 16, 213-216. [In Russian.]
- b. IZYUMOVA, N. A., 1956.—[Specificity of *Dactylogyrus vastator* and *D. solidus* to their hosts.] 16, 217-228. [In Russian.]
- c. IZYUMOVA, N. A., 1956.—[Materials on the biology of *Dactylogyrus vastator* Nybelin.] 16, 229-243. [In Russian.]
- d. SMOGORZHEVSKAYA, L. A., 1956.—[Trematodes of fish-eating birds of the river Dnieper valley.] 16, 244-263. [In Russian.]
- e. ZHUKOV, E. V., 1956.—[Materials on the parasite fauna of predacious birds.] 16, 264-279. [In Russian.]

(270a) Re-examination of Serkova's original material shows that the parasite from lariform birds in Western Siberia described by her as *Squamofilaria macroovata* [see *Parazitologicheski Sbornik*, 1948, 10, 209-244] is the pentastomid *Reighardia sternae*. G.I.P.

(270b) When kept in an aquarium for 18 to 20 days, 28.5% of crucian carp acquired infection with *Dactylogyrus vastator* from infected common carp, showing that these two species cannot be kept in the same breeding ponds. As *D. solidus* is specific to the common

carp it does not spread under natural conditions to the crucian carp, which, however, can be infected experimentally. Data are given to show that under experimental conditions young *Carassius* became increasingly susceptible to infection with the larvae of *D. vastator* from *Carassius*. G.I.F.

(270c) Larvae of *Dactylogyrus vastator* swim freely from 6 to 17 hours but are infective only for four to eight hours or, at the maximum, ten hours. *D. vastator* can already infect young carp of 1 cm. in length and reaches maturity within eight hours at 15–22°C. G.I.F.

(270d) This is a continuation of a paper published in 1953 on the trematodes of fish-eating birds of the river Dnieper. 82.9% of the 388 birds collected from 1947 to 1953 were infected with 82 species of trematodes, which are listed with their hosts; rarer species are described. There are 25 new host records and 12 species are new for Russia. A table gives the number of each bird species autopsied and their numerical and specific infection with trematodes. G.I.F.

(270e) Zhukov lists 20 trematode, 12 nematode, 3 cestode and 2 acanthocephalan species from predacious birds in the Astrakhan preserve and the Izmail area of the Danube delta, with short notes on the occurrence of the species in Russia. G.I.F.

271—Pflanzenarzt. Vienna.

- a. BÖHM, O., 1956.—“Beobachtungen an österreichischem Kartoffelälchenmaterial.” 9 (8) 76–77.
- b. BÖHM, O., 1956.—“Massenaufreten des Zwiebelälchens.” 9 (9), 86–87.

(271a) Potatoes planted in pots of soil each containing 60 cysts of *Heterodera rostochiensis* were grown at three temperature ranges, namely 7–14°C., 10–18°C. and 20–25°C., and at three different air humidity rates namely 30–55%, 70–80% and 90–100%. At the lowest temperature only weak infestation occurred, while at the highest temperature infestation was at a medium rate and at the middle range it was heaviest. The plants kept at the highest relative humidity bore fewer cysts than those at corresponding temperatures which were kept at 30–80% humidities. The rate of development of the nematode was strongly influenced by temperature but not by soil moisture. Yellow cysts appeared after 2–2½ months at the middle temperature range and brown cysts after four months while brown cysts were found in 2½ months at the high temperatures and at the lowest temperatures only white and yellow cysts were found after four months. In a second experiment pots of soil containing potato-root eelworm cysts were stored for two years at temperatures from 5–30°C. under four different moisture conditions: (i) 50–80% relative air humidity without water; (ii) 50–80% relative humidity with regular watering to keep the soil moist; (iii) 100% relative humidity without water; (iv) 100% relative humidity with regular watering. At the end of the experiment over 50% of the cysts still contained complete viable contents in treatments (i), (ii) and (iii) while in (iv) only 23% were full. The total cyst content was dead in 52% of cysts in treatment (iv), 25% in (ii), 13.5% in (i) and 6.5% in (iii). Thus, standing water damages the cyst contents but prolonged dryness has little effect. Measurements of cysts and eggs showed that size of egg was not correlated with cyst size. It is concluded that this nematode can be a successful parasite in the dry regions of eastern Austria. M.T.F.

(271b) Wide-spread damage by *Ditylenchus dipsaci* occurred on onions in Austria in the spring of 1956. It is attributed to the cool damp weather. Böhm describes the symptoms of disease, the conditions of soil type and moisture which favour the nematode and methods of control by crop rotation, elimination of weed hosts and selection of clean plants for seed production. M.T.F.

272—Phytopathology.

- a. KRUSBERG, L. R. & SASSER, J. N., 1956.—“Host-parasite relationships of the lance nematode in cotton roots.” **46** (9), 505-510.
- b. GILPATRICK, J. D., ICHIKAWA, S. T., TURNER, M. & MCBETH, C. W., 1956.—“The effect of placement depth on the activity of Nemagon.” **46** (10), 529-531.
- c. MOORE, E. L., DROLSOM, P. N., TODD, F. A. & CLAYTON, E. E., 1956.—“Black shank resistance in flue-cured tobacco as influenced by tolerance to certain parasitic nematodes.” **46** (10), 545-550.
- d. DUCHARME, E. P. & BIRCHFIELD, W., 1956.—“Physiologic races of the burrowing nematode.” **46** (11), 615-616.
- †e. ANDERSON, E. J., 1956.—“Comparison of initial kills and subsequent increase of nematode populations following soil fumigation.” **46** (11), 634.
- †f. BOSHER, J. E. & NEWTON, W., 1956.—“Hot water treatment of apple stocks for the control of nematodes.” **46** (11), 634-635.
- †g. ICHIKAWA, S. T., 1956.—“Nematode control versus application depths of Nemagon.” **46** (11), 637.
- †h. JENSEN, H. J. & HORNER, C. E., 1956.—“A decline of peppermint caused by an ectoparasitic nematode, *Longidorus sylphus*.” **46** (11), 637.
- †i. LORING, L. B. & JENSEN, H. J., 1956.—“Survey for soils in Oregon free of root-lesion nematodes.” **46** (11), 638.
- j. TARJAN, A. C., SIMANTON, W. A. & RUSSELL, E. E., 1956.—“A labor-saving device for the collection of nematodes.” **46** (12), 641-644.
- k. ROBINSON, T. & NEAL, A. L., 1956.—“The influence of hydrogen ion concentration on the emergence of golden nematode larvae.” **46** (12), 665-667.
- l. HARE, W. W., 1956.—“Comparative resistance of seven pepper varieties to five root-knot nematodes.” **46** (12), 669-672.

(272a) *Hoplolaimus coronatus* was present in large numbers in the soil in which cotton plants, showing severe stunting, yellowing and defoliation, were growing. In the green-house the eelworm increased in cotton roots with little effect on the cotton but did not increase in the absence of cotton. *H. coronatus* feeds both ecto- and endo-parasitically on cotton roots causing damage to cells of the cortex and stele but mostly to the phloem. Eggs are laid within the roots. Injured xylem elements produced many tyloses. J.B.G.

(272b) Nemagon (1, 2-dibromo-3-chloropropane) was applied at different depths with a hand gun injector and by machine to soil infested with *Meloidogyne incognita* var. *acrita*, and the effectiveness of control of the nematode at different depths was tested by growing squash or tomato plants. When injected 2 in. deep in sandy soil control of the nematodes down to 12 in. was almost complete. Injection at 4 in. gave control down to 18 in., while injections at 10-12 in. gave good control to 36 in. but some infestation remained in the top layers of soil. Placement at 6-8 in. is recommended for both surface and deep control. A comparison of liquid Nemagon with a formulation on Attaclay granules showed the two to be equally effective in the top 24 in. of soil but from 24-36 in. the liquid was the more effective. The rates of application used were 1 and 1.25 gal. of liquid Nemagon per acre and soil temperatures at 8 in. depth were 62°F. and 180°F. in the hand gun machine experiments respectively. M.T.F.

(272c) The tobacco variety Dixie Bright 101, developed for resistance to black shank disease caused by *Phytophthora parasitica* var. *nicotianae*, was found to be severely affected by the disease in certain fields where *Meloidogyne* spp., *Pratylenchus* spp. and occasionally *Tylenchorhynchus claytoni* were present. The varieties Hicks and Bottom Special appeared to be more tolerant to nematodes than Dixie Bright 101. In an attempt to breed plants resistant to both black shank and nematodes, Dixie Bright 102 (related to Dixie Bright 101 but more resistant to black shank) was crossed with Hicks and Bottom Special. Three F₆ selections from the Dixie Bright 102 × Hicks cross were more resistant to black shank than the first-named parent. An F₅ selection from the Dixie Bright 101 × (Dixie Bright 102 × Bottom Special) cross had intermediate resistance. Both these selections developed relatively normally in the presence

† Abstract of paper presented at the 38th Annual Meeting, American Phytopathological Society, Seattle, Washington, June 13-15, 1956.

or absence of black shank although invaded by moderate numbers of *Pratylenchus* and *Meloidogyne*. The yields were 14% to 30% higher than those of Dixie Bright 101 and of better quality. M.T.F.

(272d) In the field there appear to be two, possibly three, biological races of *Radopholus similis*, one specific to banana, one to both banana and citrus and the third to citrus. The behaviour of the first two races was confirmed by pot experiment. A table sets out the dimensions and proportions of 100 eelworms from each race. Observations failed to show any morphological differences. J.B.G.

(272e) Results from the application of D-D mixture, ethylene dibromide and 1, 2-dibromo-3-chloropropane indicate that the best initial kill of nematodes was with D-D at 40 gallons per acre applied as a row treatment under cover. The greatest increase in the nematode population occurred in the plots treated with ethylene dibromide. The nematode observed was *Rotylenchulus reniformis*. H.R.W.

(272f) Up to 235 specimens of *Pratylenchus*, chiefly *P. penetrans*, per gramme of feeder roots were found in about 75% of clonal apple stocks recently imported into British Columbia. Root injury was usually associated with populations of 80, or over, per gm. Warm-water treatments of small maiden stocks destroyed the nematodes as follows: 110°F. for 1 hr., 112°F. for 40 min., 115°F. for 20 min., 118°F. for 15 min., 121°F. for 7 min., 124°F. for 2½ min. or 127°F. for 1 min. Soaking for two hours at 70°F. before treatment improved the results and post-treatment cooling in running tap-water was also carried out. Least injury to the plants resulted when they were taken for treatment from cold storage at 34–38°F. in January and returned to cold storage until planted in spring. Secondary invasion by fungi was prevented by a 1 min. dip of the roots in 0.5% Tersan (75% thiram). M.T.F.

(272g) The effect of placement depth on the activity of Nemagon was studied by injecting this nematicide at various depths into a field of sandy loam heavily infested with root-knot nematode *Meloidogyne incognita* var. *acrita*. Ichikawa suggests that for most purposes a six to eight inch placement of Nemagon gives both good penetration and surface control. H.R.W.

(272h) Jensen & Horner describe symptoms of decline in commercial peppermint (*Mentha piperita* var. Mitcham) grown in Oregon. Plants are stunted, reddish in colour, with most feeder roots reduced to stubs. Tufts consisting of numbers of *Longidorus sylphus* were found on the roots. It is claimed that the pathogenicity of this nematode is demonstrated by comparing plants grown in sterilized and non-sterilized infested field soil. Greatest differences were observed when rhizomes were used as planting stock but rooted cuttings were also severely injured. Preliminary, but unspecified, soil fumigation experiments are said to be encouraging. M.T.F.

(272i) A survey of Oregon soils from 97 places showed the presence of *Pratylenchus pratensis* and *P. penetrans* in 53% of samples from cultivated areas, in 22% of those from permanent pasture and in 6% of those from timbered areas. The tilled and unimproved areas at higher elevations have remained relatively free from these eelworms. J.B.G.

(272j) A device for extracting nematodes from soil and incorporating sieving and elutriation is described. The apparatus is based on Oostenbrink's methods and uses spray nozzles to wash the sample through the upper sieve and to agitate the water at the base of the elutriation tube. The overflow is allowed to pass through a series of graded sieves. It is claimed that about 96% of nematodes can be recovered from a sample in ten minutes. J.B.G.

(272k) The authors found that emergence of *Heterodera rostochiensis* larvae was greatest at a pH between 2.0 and 3.0 in aqueous solutions of hydrochloric, citric and fumaric acids.

In diffusate from tomato roots adjusted to pH 2.5 with hydrochloric acid, larval emergence was stimulated, retarded or hardly affected. Leachings diluted ten times caused greater hatching at pH 2.5. It is suggested that the reported effects of anhydrotetrone acid may not have been as a specific hatching stimulant but as an effect of pH.

J.B.G.

(2721) Seven varieties of *Capsicum frutescens* were tested for susceptibility to five species of *Meloidogyne*. Early California Wonder, Oakview Wonder and 4795B Peru were attacked by *M. incognita* and *M. incognita acrita*. Early California Wonder was attacked by *M. arenaria* but was moderately resistant to *M. javanica*. Oakview Wonder and 4795B Peru were resistant to *M. arenaria* and *M. javanica*. Red Chili and P.I. 135824 were resistant to *M. javanica* and *M. arenaria* but were slightly attacked by *M. incognita* and *M. incognita acrita*. Santanka xS and 405B Mexico were resistant to all *Meloidogyne* spp. save *M. hapla* which attacked all the peppers tested.

J.B.G.

273—Plant Disease Reporter.

- a. HORN, N. L., MARTIN, W. J., WILSON, Jr., W. F. & GIAMALVA, M. J., 1956.—"The relation of nematodes to strawberry culture in Louisiana." 40 (9), 790-797.
- b. MINZ, G., 1956.—"The root-knot nematode, *Meloidogyne* spp., in Israel." 40 (9), 798-801.
- c. SPEARS, J. F., BOWEN, F. I. & BOWERS, C. D., 1956.—"Soybean cyst nematode found in new area." 40 (9), 830.
- d. LEAR, B., 1956.—"Results of laboratory experiments with Vapam for control of nematodes." 40 (10), 847-852.
- e. OAKES, J. Y., BOLlich, C. N., MELVILLE, D. R., FIELDING, M. J. & HOLLIS, J. P., 1956.—"A preliminary report on soil fumigation for control of parasitic nematodes on corn at Curtis, Louisiana." 40 (10), 853-854.
- f. FORD, H. W., 1956.—"Chemicals screened for systemic effects against spreading decline disease of citrus." 40 (10), 861-865.
- g. BIRCHFIELD, W., 1956.—"New and suspected host plants of the burrowing nematode, *Radopholus similis* (Cobb) Thorne." 40 (10), 866-868.
- h. JENKINS, W. R., COURSEN, B. W., ROHDE, R. A. & TAYLOR, D. P., 1956.—"Occurrence of cyst nematodes, *Heterodera* spp., in Maryland." 40 (10), 869.
- i. FERRIS, J. M. & MAI, W. F., 1956.—"Viability of encysted golden nematode larvae following seasonal temperature changes and drought." 40 (11), 966-970.
- j. MINZ, G., 1956.—"Cyst-forming nematodes in Israel." 40 (11), 971-973.
- k. HOUSSNY, H. H. & OTEIFA, B. A., 1956.—"Preliminary field tests for evaluating some tomato varieties for resistance to root-knot nematodes, *Meloidogyne* spp." 40 (11), 974-976.
- l. CRITTENDEN, H. W., 1956.—"Control of *Meloidogyne incognita acrita* by crop rotations." 40 (11), 977-980.
- m. LEAR, B. & THOMASON, I. J., 1956.—"Control by soil fumigation of root-knot nematodes affecting fresh fruit and canning tomatoes in California." 40 (11), 981-986.
- n. GOOD, J. M. & CHRISTIE, J. R., 1956.—"Water pressure injector for nematocides." 40 (11), 987-988.
- o. LOWNSEBURY, B. F. & LOWNSEBURY, J. W., 1956.—"A procedure for testing the sterility of large numbers of nematodes after treatment with various sterilants." 40 (11), 989-990.

(273a) In soil samples from 40 fields in the commercial strawberry-growing area of Louisiana several species of plant-parasitic nematodes were found, the commonest being *Tylenchorhynchus claytoni* (58% of samples), *Helicotylenchus nanus* (47%), *Meloidogyne hapla* (42%), *Aphelenchoides besseyi* and *Pratylenchus leiocephalus* (10% each). In a greenhouse experiment strawberries were grown in sterilized soil to which parasitic nematodes had been added. When *Tylenchorhynchus* sp. or *M. hapla* larvae were added they multiplied considerably and in the case of *M. hapla* there was marked root damage. In an experiment with *Helicotylenchus* sp. the population five-and-a-half months after inoculation was only half the original while there had been a 14-fold increase in *M. hapla* larvae in the same time. Ethylene dibromide was used in field tests and greatly reduced nematode populations but there was an increase in strawberry yields only when *M. hapla* was controlled and not after the reduction of populations of *Tylenchorhynchus*, *Pratylenchus* or *Trichodorus*. One year's tests suggest that yields of the variety Marion Bell were not affected by the presence of numerous root galls due to *M. hapla*.

M.T.F.

(273b) The commonest species of root-knot nematode in Israel is *Meloidogyne javanica* found on 59 species of plant in ten localities. *M. incognita* was found on 17 plants in five localities, *M. incognita* var. *acrita* and *M. arenaria* each on 15 plants in five localities and *M. hapla* on seven plants in nine localities. There is a list of 70 plants with the species of *Meloidogyne* found on each; in many cases more than one species was found on a host. M.T.F.

(273c) *Heterodera glycines* has been recorded on a property 19 miles north of the area of extensive infestations at Wrightsboro, North Carolina. A third centre of infestation is at Castle Hayne, five miles north of Wrightsboro. Between these centres no infestation has been found after extensive soil sampling. M.T.F.

(273d) Vapam (sodium methyl thiocarbamate) was applied to soil infested with root-knot nematodes (*Meloidogyne incognita* var. *acrita*) and the effects assessed by means of gall counts on the roots of tomato plants after four weeks' growth. The nematodes were eradicated by the Vapam solution sprinkled on the soil at the rate of 0.5 lb. per 100 sq.ft. The chemical was retained in the surface layers of wet soil: when applied to dry soil the addition of water carried it down so that nematodes in the surface layers survived but those 12-14 in. below the surface were killed. A split application in which 75 ml. of Vapam solution was added to dry soil followed by 1,700 ml. water and then by 25 ml. of Vapam (giving a total dose of 100 lb. per acre of Vapam) killed the nematodes from 1-30 in. below the soil surface. To test the diffusion of Vapam in soil a dose of 4 ml. was injected 8 in. deep and it was found that nematodes were killed up to distances of 6-8 in. laterally and 4 in. vertically from the point of injection. This result applies to *Heterodera schachtii* as well as to root-knot nematodes. M.T.F.

(273e) A field experiment was carried out in which D-D mixture, Dowfume MC-2 (98% methyl bromide and 2% chloropicrin) and Dowfume W-85 (83% ethylene dibromide and 17% naphtha thinner) were injected at high rates on 15th February 1955 into soil containing large numbers of *Pratylenchus zeae*, *Tylenchorhynchus* sp. and *Trichodorus* sp. Anhydrous ammonia at 60 lb. per acre was added on 10th March 1955 and maize planted on 29th March 1955. D-D and Dowfume MC-2 gave good control of the nematodes and this was reflected in the yields. J.B.G.

(273f) [This is essentially the same as the author's paper which appeared in *Proc. Fl. hort. Soc.*, 67, p. 94. For abstract see *Helm. Abs.*, 23, No. 694j.]

(273g) Washed root samples of various plants were incubated in closed jars for several days. If *Radopholus similis* was found to have emerged, its presence was confirmed by root dissection. A list of 29 plants is given [not 31 as stated] of which 28 are reported as hosts of *R. similis* for the first time. Another list gives the names of 24 plants suspected of being hosts. J.B.G.

(273h) The incidence of *Heterodera* spp. found during a survey of the northern counties of Maryland was 29.6%. All the identifiable cysts were found to be *H. trifolii* (Goffart, 1932; Oostenbrink, 1949). Empty cysts of the *H. schachtii* group were found in Talbot and Caroline counties; in Wicomico and Worcester counties members of the *H. cacti* group were recovered from soya bean fields. A map shows the occurrence of the two *Heterodera* groups in Maryland. J.J.H.

(273i) By means of cyst hatching tests, Ferris & Mai examined the effects during the growing period of different conditions of temperature and soil moisture on the viability of *Heterodera rostochiensis* cultured on potatoes. Results indicated that high temperatures resulted in low viability and masked any effects of moisture variation, but drought had a deleterious effect under cool conditions. C.C.D.

(273j) Minz has found several species of cyst-forming nematodes in Israel. Some of these (*Heterodera avenae*, *H. cacti*, *H. rostochiensis*, *H. schachtii*) have been identified and found on their host plants; another species, probably *H. schachtii* var. *trifolii*, was found on sweet pea (*Lathyrus odoratus*). *H. avenae*, *H. schachtii* and probably *H. humuli* and *H. schachtii* var. *trifolii* were frequently found in soil samples. J.J.H.

(273k) Thirteen varieties of tomato were planted in a randomized design in a sandy loam field near Giza, Egypt, having a fairly high infestation of *Meloidogyne javanica*, *M. hapla*, *M. incognita* and *M. incognita* var. *acrita*. Five months after planting, the plants were lifted and root-knot indices were calculated according to the system of Smith & Taylor. The variety Pearl Harbour showed a high degree of resistance to all root-knot species while Urbana and Illinois T.19 were fairly susceptible to *M. javanica* and *M. hapla* but tolerant to *M. incognita* and its variety *acrita*. It is considered that the results encourage the planning of a tomato breeding programme. M.T.F.

(273l) Twelve different three-year crop rotations were tried on a field heavily infested with *Meloidogyne incognita* var. *acrita*, the treatments being replicated six times in a randomized block. In the fourth year cantaloups were grown and yields and root-knot indices were taken. The best results followed three years of resistant crops (*Crotalaria spectabilis*, Blackhawk soya bean and clean fallow in May and June followed by Monroe soya bean). Equally good were two years of Blackhawk soya bean or *Crotalaria spectabilis* followed by Monroe soya bean. Good control of root-knot was not always directly correlated with the highest yield of melons. M.T.F.

(273m) Results of field experiments on the control of root-knot nematodes *Meloidogyne incognita* var. *acrita* and *M. javanica* in the tomato growing areas of California are given. Various nematicides were used and a comparison is made of row-placement applications and broadcast applications with a view to reducing costs of fumigation. The results indicate that row-placement applications of D-D mixture, ethylene dibromide and Nemagon give as good a control as broadcast applications. Broadcast applications of Nemagon at 1.5 gallons per acre or row-placement applications of 0.6 gallons per acre reduced the yield of tomatoes in some experiments. H.R.W.

(273n) Good & Christie describe an injector of simple construction for treating the roots of growing shrubs and trees with emulsifiable nematicides. The chemicals are injected into the soil by means of water pressure, either from mains supply or mechanical pump and good control of *Pratylenchus* sp., *Trichodorus* sp., *Rotylenchus* sp. and *Meloidogyne* spp. is claimed. C.C.D.

(273 o) An apparatus is described for trial sterilization of live nematodes followed by testing for the presence of bacteria or fungi on the treated organisms. The apparatus consists of a vertical series of three tubes interconnected by stopcocks and sealed with cotton wool. The whole is autoclaved; the nematodes are then introduced into the upper tube containing the sterilizing agent, transferred to the middle tube for washing and then to the lower tube containing thioglycollate culture broth. Here fungal or bacterial growths appear in from one to three weeks if the nematodes are still contaminated. Results showed that treatments giving more consistent sterility are needed. C.C.D.

274—Plant Pathology. London.

- a. THOMAS, P. R., 1956.—“Estimation of beet eelworm and cabbage root eelworm by hatching responses in host plant diffusates.” 5 (2), 62–65.

(274a) In attempts to assess the relative population densities of *Heterodera schachtii* and *H. cruciferae* in field samples containing both species, replicate batches of cysts were treated alternately with beet diffusate, specific for beet eelworm, followed by cabbage-root diffusate, and with cabbage followed by beet diffusate. A pure *H. schachtii* control was incorporated.

Greater larval emergence was, however, invariably obtained by the use of cabbage diffusate alone, which is stimulating to both species, than by the use first of beet, then of cabbage leachings. It was, therefore, not found possible to assess the presence of both species accurately and it was concluded that the hatching may have suffered in some way under the initial treatment with beet leachings. C.C.D.

275—Poultry Science.

- a. HORTON-SMITH, C. & LONG, P. L., 1956.—“The anthelmintic effect of three piperazine derivatives on *Ascaridia galli* (Schränk 1788).” 35 (3), 606–614.
- b. RIEDEL, B. B. & WEST, J. W., 1956.—“Phenylalanine and the resistance of ascarid infections in chickens.” 35 (3), 662–664.
- c. REID, W. M., 1956.—“Incidence and economic importance of poultry parasites under different ecological and geographical situations in Egypt.” 35 (4), 926–933.

(275a) The results of experiments on the anthelmintic activity of piperazine adipate, piperazine citrate and piperazine carbon disulphide on adult *Ascaridia galli* in poultry and on its larvae 17 and 21 days old are tabulated. The three substances narcotized and completely eliminated the adult worms. Considerable numbers of the larvae were also removed, while those larvae still in the tissue phase within the intestinal wall were apparently reduced in number. R.T.L.

(275b) Although phenylalanine has been found by Almquist (1945, 1947) to be indispensable in the diet of chicks, its addition to the diet does not increase their resistance to the effect of *Ascaridia galli* on their body-weight, or affect the number and average lengths of the worms. R.T.L.

276—Praktische Tierarzt (Der).

- a. SCHMIDT, H. W., 1956.—“Die Übertragung von Trichinen im Natur- und Kulturhaushalt.” Year 1956, No. 8, pp. 222, 224.

(276a) Schmidt discusses the transmission of *Trichinella spiralis* among wild animals. Ravens and crows, carrying trichinae in the contents of their gut, help to propagate the infection. The chief wild animals through which *Trichinella* is carried into human circles are the fox, badger and wild pig. Such transmission can be reduced by feeding domestic animals well to avoid their scavenging, by burning or burying at least a metre below ground any flesh dropped during the skinning of foxes and by shooting animals only when the aim is sure and the carcass can be recovered. If foxes or wild pigs are to be used for human consumption in Germany they must be officially inspected for trichinae. M.MCK.

277—Proceedings of the Society for Experimental Biology and Medicine.

- a. HANKES, L. V. & STONER, R. D., 1956.—“*In vitro* metabolism of dl-alanine-2-C-14 and glycine-2-C-14 by *Trichinella spiralis* larvae.” 91 (3), 443–446.
- b. COKER, C. M. & LICHTENBERG, F., 1956.—“A revised method for isolation of *Schistosoma mansoni* eggs for biological experimentation.” 92 (4), 780–782.
- c. SENFT, A. W. & WELLER, T. H., 1956.—“Growth and regeneration of *Schistosoma mansoni* in vitro.” 93 (1), 16–19.

(277a) When *Trichinella spiralis* larvae were released from infected mouse muscle by pepsin digestion and cultured *in vitro* in serum-Krebs-Ringer medium or Krebs-Ringer medium containing dl-alanine-2-C-14 or glycine-2-C-14, Carbon-14 analysis showed that, in both media, the uptake of the C¹⁴-labelled amino acids by the larvae was progressive during incubation for 48 hours. More C¹⁴ was incorporated from glycine-2-C-14 labelled media than from dl-alanine-2-C-14 labelled media. Tungstic acid precipitated about 70% to 84% of the total C¹⁴ incorporated by the larvae cultured in the former media and about 32% to 57% of that incorporated in the latter. R.T.L.

(277b) Coker & Lichtenberg developed a method of isolating *Schistosoma mansoni* eggs in adequate quantities and sufficiently pure to allow of biological assays *in vitro* and *in vivo*. Hamster livers were comminuted, filtered and washed and the rough-clean sediment concentrated in 5 ml. of saline and carefully overlaid upon a filtered solution of freshly prepared 0.5 Molar sucrose in a 50 ml. burette. Particles heavier than the eggs can then be drawn off and discarded after 15 minutes. After one hour 15 ml. are drawn off into a centrifuge tube. This tube contains the bulk of the eggs which are then washed free of sucrose and concentrated in 1.7% saline solution. Eggs thus obtained, will hatch and retain their acid-fast property, and the normal antigenic quality of reacting with circumoval precipitins in human immune serum. D.L.H.R.

(277c) Senft & Weller used a medium consisting of 45% bovine amniotic fluid, 45% Hanks' balanced salt solution, 5% inactivated horse serum and 5% beef embryo extract (with penicillin and streptomycin) to culture schistosomulae of *Schistosoma mansoni*. The medium was changed at two to four-day intervals and was supplemented in certain experiments by the addition at weekly intervals of freshly washed mouse red blood cells. Although all worms showed some increase in length, the survival time *in vitro* of worms measuring less than 0.5 mm. was limited. Two worms obtained from mice on the 16th day of infection, however, were still alive after 35 days in culture, the female had increased in length from 2.08 mm. to 4.58 mm. while the male had increased from 1.52 mm. to 4.08 mm. Immature worms obtained from mice 30 or more days after infection survived for many weeks, growth occurred and copulation began but no eggs were produced. Addition of red cells was followed by active feeding and accelerated somatic movements. Worms wounded during the recovery process were observed to regenerate the missing part *in vitro*. D.L.H.R.

278—Queensland Journal of Agricultural Science.

- a. COLBRAN, R. C., 1956.—"Studies of plant and soil nematodes. 1. Two new species from Queensland." 13 (2), 123-126.

(278a) *Hemicycliophora truncata* n.sp. is described and figured associated with the roots of Rhodes grass *Chloris gayana*. It is characterized by the posterior position of the vulva and the presence of loose cuticle reflexed behind the tail. *Trichodorus minor* n.sp. is also described and figured. This was found associated with roots of *Lycopersicon esculentum*, *Sesbania aculeata*, *Persea americana*, *Medicago sativa*, *Prunus persica*, *Citrus* sp. and *Saccharum officinarum*. The nematode is distinguished from *T. primitivus* and *T. pachydermus* by the absence of males, smaller size and presence of oesophageal lobes. J.B.G.

279—Refuah Veterinarith. Jerusalem.

- a. NOBEL, T. A. & OLAFSON, P., 1956.—[Spinal nematodiasis in sheep. First report in Israel.] 13 (1), 1-3. [In Hebrew: English summary p. 52.]

(279a) As ataxia of the hind quarters was observed in a flock of sheep near Tel-Aviv, one was slaughtered. Sections of the brain and spinal cord revealed demyelination of the right ventral column of the spinal cord, cavitation of the white matter surrounding the left ventral roots and several cross sections of parasites. The symptoms and lesions resembled those of cerebral nematodiasis and neurofilariasis. This is the first record of the occurrence of this condition in Israel. R.T.L.

280—Rendiconti. Istituto Superiore di Sanità. Rome.

- a. RICCI, M., 1956.—"Sulla diagnosi della ossiurosi con il metodo di Graham." 19 (2/3), 226-229. [English, French & German summaries pp. 226-227.]
 b. RICCI, M. & CORBO, S., 1956.—"Sull'azione dell'idrato di piperazina verso *Enterobius vermicularis*." 19 (2/3), 230-239. [English, French & German summaries pp. 230-231.]

- c. RICCI, M., 1956.—“Il parassitismo intestinale nella popolazione infantile di Lampedusa” 19 (4/5), 398–404. [English, French & German summaries pp. 398–399.]

(280a) [This paper appeared in *Riv. Parassit.*, 1955, 16, 59–60. For abstract see *Helminthol. Abs.*, 24, No. 42a.]

(280b) [This paper appeared in *Riv. Parassit.*, 1955, 16, 73–82. For abstract see *Helminthol. Abs.*, 24, No. 152a.]

281—Report. Department of Agriculture, New Zealand.

- a. ANON., 1956.—“Annual Report of the Director-General of Agriculture for the year ended 31st March, 1956.” Year 1955–56, 178 pp. [See pp. 49–50, 70–71, 114–115.]

(281a) Parasite-free lambs, reared indoors, were left on worm-free pastures for several months; one half was infected artificially with nematode larvae, the other was used as a control. Both lots grew well on long mature feed during the dry period of January and February. With the advent of rains both lots ceased to grow when the pasture was short, leafy and well controlled by topping and typical ill-thrift developed in both lots. The clinical complications which usually occur in the field were absent. It is concluded that, in hogget ill-thrift, parasites (except occasionally *Haemonchus contortus*) were not causative but were of secondary importance, and that the immature forms although more resistant to phenothiazine than the adults were unimportant. Trials were again made on the effect of particle size on the efficiency of phenothiazine. A sample in which all the particles were less than 10μ in diameter was significantly better than coarser samples. Near Wallaceville, worm larvae in spelled pastures under controlled rotation were not affected adversely for periods up to one month in the hottest and driest summer months, but decreased in those spelled during the winter. The number of larvae on the herbage in the weeks following flooding were the highest for the year. In spite of intensive publicity over a period of years the incidence of hydatid in slaughtered stock has not diminished, while that of *Cysticercus ovis* is increasing and has almost reached 1% of the ewes and lambs slaughtered at a big works at Auckland.

R.T.L.

282—Research Bulletin of the Panjab University, Hoshiarpur.

- a. GUPTA, N. K., 1956.—“Studies on the digenetic trematodes of marine fishes from the Gulf of Manaar (India).” No. 89 (Zoology), pp. 61–83.

(282a) Gupta describes eight species of Trematoda from marine fishes in the Gulf of Manaar. Six of these are new and one of the new species is made type of a new genus *Buckleytrema*. *Stenopera pterois* n.sp. from *Pterois russellii* is larger than *S. equilata*, has a longer oesophagus and larger eggs, the vitellaria extend to the posterior end of the body and the ovary has seven lobes. *Hamacreadium leiperi* n.sp., from a marine catfish, is distinguished by its trilobed ovary. The genital pore lies to the left of the median line much behind the intestinal fork; in this respect it resembles *H. pallenisicum* but differs from it in the shape of the ovary and the extent of the vitellaria which reach from the level of the oesophagus to the posterior end. *H. krusadaiensis* n.sp. has a trilobed ovary but differs from *H. leiperi* and *H. pallenisicum* in the position of the genital pore on the left of the median line in front of the gut bifurcation and close to the pharynx. *Opecoeloides manaarensis* n.sp. in *Upeneoides* sp. is characterized by the presence of nine papillae on the acetabulum and the somewhat triangular shape of the ovary. *Buckleytrema indica* n.g., n.sp. is from a marine catfish. The post-acetabular testes are placed obliquely to one another. The ovary is pre-acetabular. The vitellaria and caeca do not reach the posterior end of the body. *Steringophorus lethrinus* n.sp., from *Lethrinus* sp. is distinguished from the four known species of the genus by the presence of a much elongated cirrus-sac, a globular and peculiarly shaped acetabulum, and the extension of the vitellaria from a little behind the acetabulum to slightly in front of the posterior extremity.

R.T.L.

283—Revista de Agricultura. São Paulo.

- a. LORDELLO, L. G. E. & ZAMITH, A. P. L., 1956.—“Novas observações sôbre os nematódeos que parasitam a batatinha no Est. de S. Paulo.” **31** (1), 45-54. [English summary pp. 52-53.]
- b. LORDELLO, L. G. E., 1956.—“Parasitismo de *Meloidogyne javanica* em raízes de abóboreira (Nematoda, Heteroderidae).” **31** (2), 135-138. [English summary pp. 137-138.]

(283a) *Helicotylenchus nannus* Steiner, 1945 is redescribed from potato. No males were found. It occurred in the pustules formed on the tubers by *Pratylenchus* sp. and in large numbers in the soil. *Meloidogyne javanica*, apparently subspecies *bauiensis* Lordello, 1956, was also found in the tubers. Measurements are given of eggs, larvae and adults. Some male intersexes were found. For the control of root-knot, crop rotation is recommended and the selection of clean seed potatoes. If economic conditions permit, soil fumigation with a nematicide may be carried out. Insufficient is known of the host plants of *H. nannus* to make possible recommendations for crop rotations for the control of this nematode. M.T.F.

(283b) On the roots of squash (*Cucurbita maxima*) *Meloidogyne javanica* produces small galls of diameter 2-3 times that of normal roots. Many of the mature female nematodes protrude from the roots and are seen as white bodies with yellowish egg-masses attached. The breaking of the root surface allows the entry of secondary pathogens. M.T.F.

284—Revista Brasileira de Biologia.

- a. FREITAS, J. F. TEIXEIRA DE, 1956.—“Breve nota sôbre Opisthgoniminae Travassos, 1928 e grupos afins (Trematoda, Plagiorchoidea).” **16** (2), 141-144.
- b. RIBEIRO, L. P. & VILLELA, G. G., 1956.—“Paper electrophoretic studies of hemoglobins from the worm *Tetrameres confusa*. A comparison with hen hemoglobins.” **16** (2), 145-147. [Portuguese summary p. 147.]
- c. LOBATO PARAENSE, W. & DESLANDES, N., 1956.—“*Australorbis inflexus* sp.n. from Brazil (Pulmonata, Planorbidae).” **16** (2), 149-158.
- d. LORDELLO, L. G. E., 1956.—“A redescription of *Dorylaimus krygeri* Ditlevsen, 1928, from Brazil (Nematoda, Dorylaimidae).” **16** (2), 163-165.
- e. CABALLERO Y C., E., HIDALGO E., E. & GROCOTT, R. G., 1956.—“Helminthos de la República de Panamá. XVII: Cuatro especies de tremátodos de peces marinos con descripción de una nueva forma.” **16** (2), 181-194. [Portuguese summary p. 193.]
- f. LOBATO PARAENSE, W. & DESLANDES, N., 1956.—“Diagnostic characters of the Brazilian species of *Australorbis* (Pulmonata, Planorbidae).” **16** (3), 281-286.
- g. FREITAS, J. F. TEIXEIRA DE, 1956.—“Observações sôbre as espécies sul-americanas do gênero *Oswaldocruzia* Travassos, 1917 (Nematoda, Strongyloidea).” **16** (3), 309-315.
- h. FREITAS, J. F. TEIXEIRA DE, 1956.—“Novo parasito de réptil da Ilha Fernando de Noronha: *Moaciria alvarengai* g.n., sp.n. (Nematoda, Subuluroidea).” **16** (3), 335-339.

(284a) The trematodes of the respiratory and anterior digestive systems of South American reptiles, principally those belonging to Opisthgoniminae and Liophistrematinae, are reclassified into Opisthgoniminae for *Opisthgonimus* and *Westella*, Liophistrematinae for *Liophistrema*, Sticholecithinae n.subf. for *Sticholecitha* and Bieriinae n.subf. for *Bieria*. The four subfamilies are placed in Opisthgonimidae n.fam. in Plagiorchoidea. *Westella afranioides* (Pereira, 1929) is proposed as a new combination. The curious protruding dorsal body, recorded on *Sticholecitha serpentis* by Prudhoe as a possible artefact, was confirmed in a live specimen from a Brazilian snake. M.MCK.

(284b) In earlier papers Villela & Ribeiro have shown that the pigment in the perienteric fluid of *Tetrameres confusa* from the hen contained three components, all positive to the benzidine test and one of them moving with the same mobility as the host haemoglobin. A typical paper electrophoretic diagram of the hen haemoglobins and the percentage composition of the electrophoretic fractions obtained by planimetry for hen and worm haemoglobins are now given, which indicate that Component III of the worm pigment has the same mobility as the alpha-haemoglobin of the hen. M.MCK.

(284c) All of several thousand field specimens of *Australorbis inflexus* n.sp. from the States of Minas Gerais and Rio de Janeiro in Brazil were negative for schistosome cercariae. Attempts to infect 150 of them, each with ten miracidia of *Schistosoma mansoni*, were unsuccessful. The local planorbid at Retiro, near Juiz de Fora in Minas Gerais, regarded by Lutz (1918) as *Planorbis centimetralis*, almost certainly belongs to *A. inflexus*. M.M.C.

(284d) Lordello figures and redescribes the adult female of *Dorylaimus krygeri* collected at Piracicaba, São Paulo State, Brazil. This species was originally based on material from green turf in the Faroe Islands and young specimens have been reported from around roots of cherry trees in Japan. M.M.C.

(284e) A new trematode and three others constituting new geographical records are described from fish of the Pacific Ocean near the Panama Canal. *Paracryptogonimus macropsinus* n.sp. from *Centropomus pectinatus* is distinguished by the 37-39 peribuccal spines which are oblong and measure 0.042-0.049 mm. \times 0.011-0.015 mm.; by the vitellaria which are inter- and extra-caecal and stretch from the posterior portion of the seminal vesicle almost to the testes; by the extension of the seminal vesicle in the mid-line from the anterior border of the seminal receptacle to the gonopore; by the uterus, which fills the posterior part of the body; and by the size of eggs (0.015 mm. \times 0.008-0.009 mm.). *Squalonchocotyle microstomum* from *Sphyrna mokarran* resembled *S. tiburonis* in some of the measurements and the shape of the oral sucker; it differed from *Neoerpecotyle tudes* in the shape of the dorsal appendages and its hooks and of the hooks on the opisthaptor. *N. tudes* is transferred to *Squalonchocotyle* as *S. tudes* (Cordero, 1944) n.comb. *Udonella caligorum* and *Bucephalus introversus* are redescribed and figured from *Centropomus pectinatus*. M.M.C.

(284f) The anatomy of the genitalia of *Australorbis glabratus* and *A. centimetralis* is figured and a key, based on their anatomical characters, is given for the differentiation of the five Brazilian species of the genus. R.T.

(284g) The characteristics of the four species of *Oswaldocruzia* which occur in South America are succinctly annotated and their measurements are tabulated. *O. subauricularis* and *O. brasiliensis* are figured. R.T.

(284h) *Moaciria alvarengai* n.g., n.sp. was obtained from the large intestine of *Mabuya maculata* from the Isle of Fernando de Noronha, Brazil. The presence of a gubernaculum easily distinguishes the new genus from *Strongyluris*. R.T.

285—Revista Brasileira de Medicina.

- a. REZENDE, J. M. DE, 1956.—“A verminose no municipio de Bela Vista (Mato Grosso)” 13 (1), 25-27.

(285a) Faecal examinations of 500 people (private patients and those attending public institutions) in Bela Vista, State of Mato Grosso, Brazil, revealed: *Necator americanus* in 38, *Strongyloides stercoralis* in 35, *Trichuris trichiura* in 18 and *Ascaris lumbricoides* in four. No eggs of *Schistosoma mansoni* were found. M.M.C.

286—Revista de Medicina Experimental. Lima.

- a. ROMÁN, C., 1956.—“Nota sobre incidencia de hidatidosis en alpacas y ovinos de la sierra del Perú.” 10 (1), 85-87.

(286a) The livers and/or lungs of 218 out of 530 sheep in the Department of Puno and 90 of 470 alpacas in the Department of Cusco in the Peruvian Andes were infected with hydatid. One sheep had cardiac hydatid infection. According to recent press reports, clinical operations for hydatid are becoming frequent in the towns of Arequipa and Cusco. M.M.C.

287—Revue d'Élevage et de Médecine Vétérinaire des Pays Tropicaux.

- a. GRABER, M. & RECEVEUR, P., 1956.—“Parasitisme interne du mouton en zone sahélienne, oesophagostomose nodulaire en particulier.” 9 (1), 5-20. [English & Spanish summaries p. 20.]
- b. GRABER, M., 1956.—“Action d'un nouvel anthelminthique: le dithiocarbamate de pipérazine sur les nématodes du mouton. Premières observations.” 9 (2), 141-147. [English & Spanish summaries p. 147.]

(287a) In 315 sheep examined post mortem in the region of Lake Chad in French Equatorial Africa over a period of 15 months, the commonest parasites were: *Strongyloides papillosus* in 250, *Oesophagostomum columbianum* in 208, *Cysticercus tenuicollis* in 238 and anoplocephalids in 169. The mortality of sheep in this region is 21% to 25%. To the west (Fort Lamy, a part of Kanem) the most important parasites are anoplocephalids; the local short-haired peul sheep are moved great distances and not kept long near water. In the mountains of Ouadaï, the long-haired, black, Arabic-type sheep are concentrated at watering places in great numbers for long periods and their most serious parasite is *O. columbianum*. Infections with this worm are not heavy from mid-May to the end of July. At this time sheep begin to be watered from pools instead of wells. From August to the beginning of October, in the wet season, larval populations build up on the pastures and infections and losses increase. At the end of October the oncoming dryness reduces the larval populations on pastures and the parasite meets a severe check in the dry season from January to mid-May; faecal examinations are of use only from February to October. Treatment should consist of two doses of phenothiazine, each of 0.8 gm. per kg. body-weight given at intervals of 24 hours in May or June, with due precautions for this large dose. For each of 45 sheep Graber & Receveur tabulate the number of *O. columbianum* present and the percentages of males and of mature and immature females. M.MCK.

(287b) Piperazine dithiocarbamate given to sheep as a single dose of 125 mg. per kg. live-weight completely removed *Oesophagostomum columbianum* within thirty hours, but was only 40% to 45% effective against *Haemonchus contortus*. R.T.L.

288—Revue de Pathologie Générale et de Physiologie Clinique.

- a. BOUISSET, L., RUFFIÉ, J. & ARNOLD, M., 1956.—“Nouvelle mention d'un *Tetrathyridium* parasite d'oiseaux (Rudolphi 1819). Quelques ectoparasites de *Passer domesticus* (L.).” 56 (674), 136-140.

(288a) Numerous *Tetrathyridium* larvae were present throughout the viscera and encysted in the tissues of an apparently healthy *Passer domesticus* from Toulouse. R.T.L.

289—Rhodesian Tobacco.

- a. DAULTON, R. A. C., 1956.—“Nematode and weed control in tobacco seedbeds.” No. 13, pp. 4-5.

(289a) Nine chemicals and steam were used on tobacco seed-beds infested with *Meloidogyne* sp. and their effects on the control of weeds and root-knot, and on the subsequent germination of tobacco, are tabulated. The best results in all three categories were given by steam at 100 lb. per sq. in. for 30 min. and methyl bromide applied under a cover at rates of $\frac{1}{2}$ to 2 lb. per sq. ft. N.244 (chlorophenyl methyl rhodanine) at 3 gm. per sq. ft. controlled weeds and root-knot but also inhibited tobacco germination. Practical details are given for the application of methyl bromide and the recommended dose is 1 lb. per 100 sq. ft. Re-contamination from soil and water must be guarded against. M.T.F.

290—Rivista di Parassitologia.

- a. ZAVATTARI, E., 1956.—“Malacofauna e schistosomiasi nel medio e basso Giuba.” 17 (4), 193–202. [English summary p. 202.]
- b. LAI, M., 1956.—“*Ostertagia (Ostertagia) mossi* (Dikmans, 1931) parassita dell'abomaso dei bovini e dei caprini.” 17 (4), 203–208. [English summary p. 208.]

(290a) The presence of *Physopsis globosa* is now reported for the first time along the middle and lower reaches of the Juba River, in Somalia where two-thirds of the local population is affected with urinary schistosomiasis. R.T.L.

(290b) The occurrence of *Ostertagia mossi* (Dikmans, 1931) in cattle and goats in Sardinia is reported. R.T.L.

291—Roczniki Nauk Rolniczych. Seria A. Roślinna.

- a. BERBEĆ, E., 1956.—“Przyczyny masowego występowania matwika burakowego—*Heterodera schachtii* Schm.—na Kujawach.” 72 (4), 621–640. [English & Russian summaries pp. 639–640.]

(291a) Berbeć stresses the necessity for crop rotation on sugar-beet farms. On the farms which were under observation it was found to be inadvisable to grow sugar-beet or other plant hosts of the beet eelworm more than once in every five years. On light soils this period was extended to seven years. The growing of enemy plants such as alfalfa, seradella, chicory, flax and onions for at least two years is also advocated. H.R.W.

292—Sad i Ogorod. Moscow.

- a. SVESHNIKOVA, N. M., 1956.—[The soil steaming apparatus.] Year 1956, No. 5, pp. 34–35. [In Russian.]

(292a) As the Russian method of steaming soil against *Heterodera* has proved unsatisfactory, the more convenient and effective method and apparatus used in Holland are described. G.I.P.

293—Science. Lancaster, Pa.

- a. CABLE, R. M. & CRANDALL, R. B., 1956.—“Larval stages and phylogeny as exemplified by the lung fluke of turtles.” 124 (3227), 890.

(293a) Cable & Crandall have studied the life-history of *Heronimus chelydrae*; although the adult is a common parasite of the lungs of fresh-water turtles little is known of its affinities as it is so different from other trematodes. The miracidium penetrates *Physa* sp. and develops into a sporocyst which gives rise directly to cercariae. The cercaria differs from paramphistome cercariae only in that it lacks eye-spots and possesses a pair of flame cell groups in the tail; there is a powerful ventral sucker which disappears before the adult stage is reached. The presence of flame cells in the tail, the posterior position of the definitive excretory pores in that structure, the thin-walled excretory vesicle and the absence of an intermediate generation in the molluscan host are characters which in combination have been reported only in the Strigeatoidea. S.W.

294—Scottish Agriculture.

- a. MABBOTT, T. W., 1956.—“Potato root eelworm. A report on an experiment to free seed potatoes from adhering soil and cysts.” 36 (2), 73–74.

(294a) Mabbott has tested the washing method of removing soil and *Heterodera* cysts from potato tubers recently devised by Sir Thomas A. Wedderspoon. The tubers are tipped on to a rubber-lined grading machine and passed through a Cooch Vegetable-Washing Plant in which the number of jets was increased and the water pressure used was 70 lb. per sq. in. The tubers were then soaked for 15 minutes in a tank containing a spreader and a disinfectant.

Thereafter, most of the excess moisture was removed by passing the tubers between sponge-rubber rollers and drying in chitting trays in a green-house. Two tons of ungraded Kerr's Pink tubers were taken from a field (air-dried soil samples from which had contained 90 viable cysts per lb.) and one ton was put through the complete process. About 8,000 of the tubers were afterwards examined with a binocular microscope but no potato eelworm cysts were found. One ton was passed through the first spray unit only and two cwt. were similarly examined. Five tubers showed single cysts still adhering to soil in cracks and eyes. It is pointed out that, although the cleaning of seed potatoes will control the spread of eelworm, a considerable increase in the cyst population will follow the frequent planting of potatoes in already infested land.

R.T.L.

295—South African Medical Journal.

- a. DE MEILLON, B., ENGLAND, E. C. & LÄMMLER, G., 1956.—"Experimental bilharziasis in animals. IV. Chemoprophylaxis in bilharziasis." **30** (26), 611-613.
- b. KAPLAN, C. S., FREEDMAN, L. & ELSDON-DEW, R., 1956.—"A worm in the eye. A familiar parasite in an unusual situation." **30** (33), 791-792.
- c. JACKSON, F. C., 1956.—"The treatment of tapeworm infestation with dichlorophen." **30** (36), 853-854.
- d. EASTMAN-NAGLE, E. R. D., 1956.—"Schistosomiasis mansoni in Swaziland. Survey by rectal biopsy." **30** (37), 890-895.

(295a) S.616 (Hoechst), a drug of which the chemical composition is not revealed, prevents the development of the Egyptian strain of *Schistosoma mansoni* in experimentally infected mice if administered on the day of exposure to cercariae and up to the 4th day following. Between the 10th and 35th day after infection the drug action is completely inhibited but after about the 35th day a single dose by the mouth of 40-50 mg. per kg. body-weight effects a cure in approximately 100%. The cercariae were killed immediately in a dilution of 200 µg. per ml. and in 25 µg. per ml. they survived only for about four minutes.

R.T.L.

(295b) An immature female *Ascaris* was extracted by forceps from the upper punctum of the right eye of an African child; it had apparently entered the nasolachrymal duct from the nasopharynx and passing into the lachrymal sac came into the lachrymal canal from which it was emerging when first seen.

R.T.L.

(295c) Tapeworms were voided by 23 out of 78 natives (in whom the presence of tapeworms had not been previously established) after each volunteer had received Dichlorophen in a dosage of one 0.5 gm. tablet per 16 lb. of body-weight.

R.T.L.

(295d) Eastman-Nagle describes the technique followed during a survey of schistosomiasis infection by rectal biopsy of schoolchildren in 18 different centres in Swaziland. The results are tabulated and the percentage incidence of *Schistosoma mansoni* and *S. haematobium* found in 1,256 snips of the rectal mucosa are plotted on a sketch map of the country. In the High-veld of the west *S. mansoni* is absent and although *S. haematobium* occurs it is probably acquired by many of the children during visits to the other regions. In the Mid-veld, in the centre of the country, *S. mansoni* incidence is low. In the Low-veld, in the east, *S. mansoni* is absent and *S. haematobium* scarce in the section between the southern border to the Great Usutu River. Between the Great Usutu River and the Bremersdorp-Stegi main road, where large irrigation projects are being developed, the molluscan vectors of both schistosomes are already present in large numbers in the canals and may become infected by immigrant workers. The great increase in both schistosome infections in the area between the Bremersdorp-Stegi main road and the northern border is attributable to the greater population density, the large irrigation scheme at Eranchi, and the Lomati and Komati rivers which are tributaries of the heavily infected Crocodile River across the border. There are differences between the rates of infection by the two schistosome species in the several sections which require further investigation.

R.T.L.

296—Southern Medical Journal.

- a. KILLINGSWORTH, W. P. & ROSS, O. H., 1956.—“Treatment of pinworms (oxyuriasis).” **49** (5), 503–507. [Discussion p. 507.]
- b. YOUNG, M. D. & FREED, J. E., 1956.—“The effect of puromycin against *Entamoeba histolytica* and other intestinal parasites.” **49** (5), 537–538.
- c. YEAGER, W., 1956.—“Clinical evaluation of a new compound for the treatment of pinworm infestation: preliminary report.” **49** (5), 539–540.
- d. BURKS, J. W. & KINGERY, F. J., 1956.—“Treatment of creeping eruption with chloroquine diphosphate: a preliminary report.” **49** (11), 1290–1292.

(296a) In the treatment of *Enterobius vermicularis*, piperazine citrate, procaine coated gentian violet, Carbazine and Terramycin appeared to be equally effective while with AL-oxyquinolate, Cremothalidine, Diphenan and garlic less than 50% of the cases treated were cured. Poor results are attributed to lack of co-operation by parents to secure completion of the treatment and to take the medication themselves. R.T.L.

(296b) Puromycin eliminated *Enterobius vermicularis* from two adult cases who had received 4 gm. in four days, but 2 gm. over a period of 10 days failed in another case. The drug had no effect on hookworm, *Strongyloides* or *Trichuris*. R.T.L.

(296c) From preliminary studies it is claimed that 40 mg. per kg. of a drug named Ro 2-5655/3 can be expected to cure about 90% of cases with *Enterobius vermicularis* but about 10% of the patients will complain of moderate stomach cramps. R.T.L.

(296d) The effect of chloroquine diphosphate on 12 patients with creeping eruption is tabulated. Within a period of two weeks there was complete clinical involution or definite regression of the disease in 10 cases. In most instances the adults received 0.25–0.5 gm., and the children 0.125 gm., thrice daily for 10 days. Antipruritic lotions and Benadryl by the mouth were used for those who complained of severe pruritus. R.T.L.

297—Southern Seedsman.

- a. ANON., 1956.—“New Nemagreen lima bean is nematode-resistant.” **19** (5), 55.

(297a) “Nemagreen” a new lima bean which has proved consistently resistant to nematode infection in green-house and field tests at Walkerton, Virginia, is now being released for commercial planting in infested soil. R.T.L.

298—Sovetskaya Meditsina.

- a. MISHCHENKO, O. S., 1956.—[A simple method of regulated administration of oxygen for anthelmintic treatment.] **20** (1), 71–74. [In Russian.]
- b. YAROSLAVSKI, V. E., 1956.—[Primary alveolar echinococcosis of spinal canal.] **20** (3), 81–83. [In Russian.]

(298a) Mishchenko describes a method of introducing given amounts of oxygen into the stomach of children with ascariasis by means of Richardson's double respiratory bulb. The dosage ranged from 300 ml. to 1,500 ml. according to age and condition. The treatment was repeated on the following day and one or two weeks later if necessary. 71% of the cases treated passed dead *Ascaris*. G.I.P.

299—Tijdschrift over Plantenziekten.

- a. LAAN, P. A. VAN DER, 1956.—“Onderzoekingen over schimmels, die parasiteren op de cysteinhoud van het aardappelcystenaaltje (*Heterodera rostochiensis* Wollenw.).” **62** (6), 305–321. [English summary pp. 318–319.]

(299a) Van der Laan briefly reviews the literature on the enemies of plant-parasitic nematodes and concludes that there is little hope of achieving biological control with the parasites and predators hitherto described. He has investigated a number of fungi associated with *Heterodera* cysts, including *Phialophora heteroderae*, *Phoma tuberosa*, *Monotospora daleae*,

Penicillium vermiculatum and *Pseudeurotium ovalis*, but the finding of *Heterodera rostochiensis* in Peru, where little damage is done to its hosts, suggested that here might be found the most effective agents of control. Peruvian *H. rostochiensis* cysts were found to contain the fungi *Anixiopsis stercoraria*, *Margarinomyces heteromorpha*, *Scrophulariopsis* sp. and others. Parasitized cysts were examined microscopically and it was found that the fungi sucked the fluids from the egg causing death to the larva within, but no further nematocidal properties were detected. Various culture methods were tried. Cysts floated from soil six months after inoculation with parasitic fungi showed reduced vitality. C.C.D.

300—Transactions of the American Microscopical Society.

- a. HUGGHINS, E. J., 1956.—“Ecological studies on a trematode of bullheads and cormorants at Spring Lake, Illinois.” 75 (3), 281–289.

(300a) In the autumn of 1949 black bullheads (*Ameiurus melas*) in Spring Lake, Illinois were almost all infected with *Diplostomulum trilobum*, the metacercaria of *Hystero-morpha triloba* parasitic in cormorants. The infections were so heavy that there was a marked decrease in fishing activity with consequent economic loss. Huggins made an oecological survey and found there was distinct correlation between the incidence in the fish and their proximity to the cormorant rookery. Flooding from the Mississippi River in the spring of 1951 resulted in a drop in the infection rate, probably because fresh stocks of bullheads entered the lake from the river. Huggins suggests that if the incidence should rise again control could be effected by eliminating the first intermediaries (*Gyraulus hirsutus*) in the vicinity of the cormorant rookery. S.W.

301—Transactions of the Royal Society of Tropical Medicine and Hygiene.

- a. McCULLOUGH, F. S., 1956.—“Transmission of *Schistosoma haematobium* by *Bulinus* sp. in the Ke district of the Gold Coast.” 50 (5), 449–457.
 b. WRIGHT, C. A., 1956.—“The generic names, *Biomphalaria* and *Planorbis*.” [Correspondence.] 50 (5), 509.
 c. McFADZEAN, J. A. & HAWKING, F., 1956.—“The periodicity of microfilariae. V. Stimuli affecting the periodic migration of the microfilariae of *Wuchereria bancrofti* and of *Loa loa* in man.” 50 (6), 543–562.
 d. ROWLANDS, A., 1956.—“The distribution of microfilariae of *Wuchereria bancrofti* in human organs.” 50 (6), 563–564.
 e. ROWLAND, H. A. K., 1956.—“The intensive treatment of urinary schistosomiasis with trivalent sodium antimony gluconate.” 50 (6), 565–575.
 f. TRIMBLE, A. P., 1956.—“Experiences in the treatment of urinary schistosomiasis with nilodin (miracid D).” 50 (6), 576–578.
 g. SCHWETZ, J., 1956.—“The effect of climatic variations on pulmonate Gastropoda, compared with that of molluscicides.” 50 (6), 579–582.
 h. SCHWETZ, J., 1956.—“The identification of snails and the mysterious schistosome vectors in the Gambia.” [Correspondence.] 50 (6), 616–617.
 i. [RODHAIN, J.], 1956.—“Obituary. Professor Jérôme Rodhain.” 50 (6), 618.

(301a) Although *Physopsis africana* is the principal vector of *Schistosoma haematobium* on the Gold Coast, this species is absent from the Ke district of the low-lying Accra plains where the only potential vectors are *Bulinus* sp. and *B. (P.) forskali*. Laboratory-bred specimens of the former were infected with miracidia hatched from eggs passed by local schoolchildren and mice subsequently infected by the cercariae contained schistosomes indistinguishable from *S. haematobium*. The people in the Ke area became infected not from the Volta river but during visits to the fresh-water lagoons and swamps several miles away. As yet, there is no direct evidence that *B. (P.) forskali* is a vector on the Gold Coast. R.T.L.

(301b) Wright controverts the arguments which led Schwetz to use the generic name *Planorbis* in preference to *Biomphalaria* and considers *Afroplanorbis* a synonym of *Biomphalaria*. He also dissents from the addition of the names *P. kivuensis*, *P. alberti* and *P. edwardi* to the literature of the Mollusca. R.T.L.

(301c) McFadzean & Hawking have investigated the effect of varying the concentration of alveolar oxygen, increasing and decreasing the carbon dioxide, moderate and violent exercises and various drugs on the periodicity of microfilariae of *Wuchereria bancrofti*, *Loa loa* and *Acanthocheiloneperstans*. They found that in patients infected with *W. bancrofti* the microfilarial counts at night were rapidly diminished by the breathing of oxygen, decreasing the carbon dioxide (hyperventilation) and by muscular exercise. None of these affected the counts of *L. loa* microfilariae but the administration of insulin or of a general anaesthetic produced a considerable diminution. The microfilarial counts of *A. perstans* were not affected by any of the stimuli. They discuss the general concept of periodicity and its relation to the 24-hour rhythm of the host and note that the cycle of the phosphorus level in the blood parallels that of the microfilariae of *W. bancrofti* although neither one is responsible for the other. The stimulus which causes this alternation of passive and active phases of the microfilariae remains to be identified.

S.W.

(301d) Rowlands examined histologically the organs of an African man who died suddenly and had microfilariae of *Wuchereria bancrofti* in the blood. She found that the lungs contained more microfilariae than did any other organ although the liver also contained a considerable number. The highest concentration of microfilariae was in the cardiac muscle but these may have been liberated from the lungs after death. Small numbers were also found in the kidney, brain, small intestine and pancreas.

S.W.

(301e) Rowland has treated a total of 148 persons with schistosomiasis haematobia with trivalent sodium antimony gluconate, using six different treatment schedules. The patients were kept under observation for six months and the criteria of cure were negative results of urine examination on three consecutive days and one rectal biopsy. With dose rates between 18 mg. and 31.3 mg. per kg. body-weight, spread over 24 to 120 hours, 83.3% of 80 patients were cured. With 12.5 mg. to 17.1 mg. per kg., over eight hours, nine out of 18 persons were cured. Although the toxicity increased with the intensity of the course the side effects were not severe.

S.W.

(301f) Trimble treated 175 cases of schistosomiasis haematobia with miracil-D at a dosage of 20 mg. per kg. body-weight daily for six days, given each day in two doses. After three to six months only eight continued to pass eggs or miracidia in the urine but cystoscopic examination of the bladder frequently showed that gross changes were still present. To reduce the toxic reactions either 10 minims of tincture of belladonna or 100 mg. of anthisan were given with the drug, the latter being apparently more effective.

S.W.

(301g) Although the eradication of the molluscan vectors of schistosomiasis is the most efficacious means of prevention it is very hard to carry out. Two striking instances are cited of the hibernation of *Physopsis* and *Planorbis* in moist earth under the hard dry crust of swamp soil formed in periods of prolonged drought in Central Africa. It is easier to destroy the parasites by treating their definitive hosts but the over-all results are less effective. Schwetz urges that although the search for new molluscicides must be pursued, other measures, e.g. drainage, drying, general hygienic procedures and above all the treatment of patients and carriers of schistosomes should not be neglected.

R.T.L.

(301h) As an illustration of the continuing confusion in the classification of African Planorbidiae, Schwetz sets out, side by side, the names of the potential vectors of schistosomiasis in the Gambia as given by McCullough & Duke and by Smithers in recent publications.

R.T.L.

302—United States Armed Forces Medical Journal.

- a. BROOKE, M. M., SWARTZWELDER, C., PAYNE, F. J., WEINSTEIN, P. & FRYE, W. W., 1956.—“Intestinal parasite survey of Korean prisoner-of-war camp.” 7 (5), 708–714.

(302a) The incidence of intestinal parasites in 1,726 North Koreans, in a prisoner of war camp on the island of Koji, and in 919 South Korean civilians was very similar except that the hookworm rate was lower in the prisoners.

R.T.L.

303—Vestnik Akademii Nauk SSSR.

- a. SHUMAKOVICH, E. E., 1956.—[Theory and practice of combating helminthiasis.] 26 (1), 101–102. [In Russian.]

304—Veterinaria. Sarajevo.

- a. BOKO, F., 1956.—“Prilog poznavanju kardijalne hidatidoze kod goveda.” 5 (2/3), 205–212. [English summary p. 205.]

(304a) Six cases of primary cardiac echinococcosis occurred in 16,000 to 17,000 cattle slaughtered at Sarajevo in 1954–55. Their localization in the left ventricle tended to bring about general weakness and cachexia if not rupture and death and seemed to have no immunological influence on the development of cysts of subsequent growth. Boko suggests the likelihood of a proportionate incidence of cardiac infection in man.

R.T.L.

305—Veterinariya.

- a. ANTIPIN, D. N., 1956.—[Principles and methods for the control of helminth parasites in farm animals.] 33 (4), 23–29. [In Russian.]
- b. KAZANSKI, S. I., 1956.—[Early anthelmintic treatment of calves with *Dictyocaulus*.] 33 (4), 30–31. [In Russian.]
- c. PUKHOV, V. I., ZINICHENKO, I. I. & PAKHARKOV, A. G., 1956.—[Methods for the eradication of *Coenurus* and *Echinococcus* of sheep.] 33 (4), 31–34. [In Russian.]
- d. GARKAVI, B. L., 1956.—[Clinical picture of experimental *Strongyloides papillosus* infestation of lambs.] 33 (4), 37–38. [In Russian.]

(305a) Antipin reviews the most important general measures in the control of helminth parasites in farm animals. These are divided into three groups: (i) prevention, (ii) anthelmintic treatment and (iii) combined prevention and anthelmintic treatment.

C.R.

(305b) Kazanski was able, in five years, to reduce the mortality of calves affected by *Dictyocaulus* from 2,428 to 56 and the number of infestations from 31,115 to 719 cases by employing early anthelmintic treatment, i.e. in the first half of July, and repeated 3–4 weeks later before the onset of clinical dictyocauliasis. By preventing the dissemination of larvae on pastures this method gave a high degree of efficacy in the control of dictyocauliasis.

C.R.

(305c) Pukhov *et al.* established that extraction of male fern root by using acetone was 21% against extraction by ether, which gave only 12.7% of extract. The best results were obtained with 0.08–0.1 gm. of this extract per kg. body-weight of dogs—given in capsules containing 0.4 gm. of extract and 0.1 gm. of powdered sugar. When given once in this dose the drug had full effect in 86% of dogs and if given twice it had full effect in 100% of treated dogs against *Multiceps multiceps* and *Echinococcus granulosus*. Treatment of dogs every 45 days against these tapeworms reduced the infestation of sheep with their larval stages to a negligible number and the authors think that using this method of treatment it is possible to eradicate these infestations in three years.

C.R.

(305d) Garkavi infected lambs and rabbits experimentally with *Strongyloides papillosus*. Eggs of *S. papillosus* were found in faeces of the lambs nine to ten days after infection, and four out of nine lambs died on 12th, 24th, 25th and 47th day after infection and four out of thirteen rabbits also died. Garkavi described in detail the lesions and symptoms of the disease and concludes that *Strongyloides papillosus* is pathogenic in young lambs and that heavy infestations may produce acute symptoms and death of animals.

C.R.

305—Veterinariya (cont.)

- e. DOLNIKOV, Y. Y., 1956.—[Mass treatment of *Ascaris* in pigs with sodium silicofluoride.] **33** (5), 38–40. [In Russian.]
- f. SEMENCHUK, K. L., 1956.—[A study of the chemoprophylactic action of phenothiazine in *Dictyocaulus* infestation of sheep.] [Abstract.] **33** (5), 45. [In Russian.]
- g. SHEVTSOV, A. A., 1956.—[The perfection of the technique for treating cattle for *Fasciola* infestation.] [Abstract.] **33** (5), 45. [In Russian.]
- h. SHARKUNAS, V. I., 1956.—[Treatment of strongyloidiasis in piglets.] [Abstract.] **33** (5), 45. [In Russian.]
- i. DMITRIEV, P. D., 1956.—[Rectal introduction of anthelmintics for *Oxyuris* infestation of horses.] [Abstract.] **33** (5), 45. [In Russian.]
- j. GAVRILYUK, P. Y., 1956.—[Intramuscular injection of carbon tetrachloride against *Fasciola* infestation in sheep.] [Abstract.] **33** (5), 45. [In Russian.]
- k. VITENKO, S. N., 1956.—[The various methods of injecting carbon tetrachloride for *Fasciola* infestation of sheep.] [Abstract.] **33** (5), 45. [In Russian.]
- l. DUKHOVSKOI, S., 1956.—[Subcutaneous injection of carbon tetrachloride for *Fasciola* infestation in sheep.] [Abstract.] **33** (5), 45. [In Russian.]
- m. AKRAMOVSKI, M. N., 1956.—[Treatment of sheep with *Fasciola* infestation by means of subcutaneous injections of carbon tetrachloride.] [Abstract.] **33** (5), 45–46. [In Russian.]

(305e) A much easier method than individual dosing is the treatment of pigs against ascariasis by mixing sodium silicofluoride with the food. A two-day treatment consisting of six feeds, each containing 0.5 gm. of the drug per pig weighing 20–40 kg. or 0.7 gm. per pig over 40 kg. cured 90–100% of the pigs, while a one-day treatment consisting of three feeds containing 0.6, 0.6 and 1 gm. respectively per pig under 40 kg. and 0.7, 0.7 and 1.5 gm. per pig over 40 kg. cured 82–90%. G.I.P.

(305g) An easy way of administering hexachlorethane to cattle is to put the chemical into a rubber tube, 35 cm. long and 5 cm. in diameter, and after placing the lower end at the base of the tongue, to pour into the tube 150–200 ml. of water. G.I.P.

(305h) Osarsol was 60–80% effective against strongyloidiasis in 216 piglets when 0.05 gm. per kg. body-weight was given twice daily for three days, while gentian violet, 0.05–0.07 gm. per kg. twice daily for three days, was 94–100% effective in 148 piglets (up to three months old). No laxatives were given. G.I.P.

(305i) Oxyuriasis in horses was successfully treated by the intubation of 50 gm. of turpentine, mixed with water, into an emptied rectum and after a 12-hour starvation diet. After a Glauber's salt enema, given two hours later, large numbers of worms were passed. G.I.P.

(305j) Gavrilyuk has treated fascioliasis by intramuscular injection of 2 ml. of carbon tetrachloride for lambs up to one year old and 3 ml. for adult sheep, mixed with vaseline or fish fat in 1:1 proportion. Two weeks later no eggs were found in the faeces. The treatment was non-toxic as well as highly effective. G.I.P.

(305k) Four different methods of treating fascioliasis by injections of carbon tetrachloride were tested on four separate groups of 15 sheep each, viz., (i) subcutaneously alone, (ii) subcutaneously after mixing with fish fat (1:1), (iii) intramuscularly after mixing with vaseline or (iv) intramuscularly after mixing with fish fat. The second method was the best and gave good results in 800 sheep. G.I.P.

(305l) Only 107 of 12,008 sheep with *Fasciola* had transient depression, loss of appetite and shivering after the injection of carbon tetrachloride by Dimidov's method [reference not cited]. G.I.P.

(305m) Subcutaneous injection of 5–6 ml. of carbon tetrachloride against *Fasciola* in sheep gave good results without side effects. 3 ml. doses were insufficient. G.I.P.

305—Veterinariya (cont.)

- n. LEONTEV, K. L., 1956.—[Diagnosis of *Fasciola* infestation in live cattle.] [Abstract.] 33 (5), 46. [In Russian.]
- o. BALABEKYAN, T. P., 1956.—[Treatment of *Neoascaris* in calves and young buffaloes with Glauber's salt.] [Abstract.] 33 (5), 46. [In Russian.]
- p. LYAPIN, G. M., 1956.—[The use of phenothiazine in *Ascaridia* of fowls.] [Abstract.] 33 (5), 46. [In Russian.]
- q. VELICHKIN, P. A. & MOLOKANOV, N. V., 1956.—[Treatment of strongyloidiasis in horses with small doses of phenothiazine.] [Abstract.] 33 (5), 46. [In Russian.]
- r. BIKTIMIROV, K. B., 1956.—[Control of *Dictyocaulus* infestation in calves.] [Abstract.] 33 (5), 46. [In Russian.]
- s. SIDOROVA, E. P., 1956.—[Surgical treatment of coenuriasis.] [Abstract.] 33 (5), 46. [In Russian.]
- t. SICHKOV, N. V., 1956.—[Coenuriasis in sheep.] [Abstract.] 33 (5), 46. [In Russian.]
- u. NIYATOV, M., 1956.—[Surgical treatment of coenuriasis in ruminants.] [Abstract.] 33 (5), 46-47. [In Russian.]
- v. MITROKHIN, V. U., 1956.—[Opisthorchiasis in rats.] [Abstract.] 33 (5), 47. [In Russian.]

(305n) By the method of successive decantations of the faeces for *Fasciola* infection, 10% of 56 cattle were found infected when 5-6 gm. samples were taken, but 27% when 20-25 gm. were used. G.I.P.

(305o) Neoascariasis was treated in 200 calves by 3-4 gm. per kg. body-weight of Glauber's salt, as a 10% aqueous solution, and in 70 calves by 0.02 gm. per kg. of santonin followed in two to three hours by a laxative. The efficacy of Glauber's salt was 80-90%, of santonin 75-80%. G.I.P.

(305p) Phenothiazine was given to a group of fowls at the dose of 2 gm. per bird in 10 gm. of barley flour mixed with water. The medicated feed was repeated after 20 days and then every 30 days. *Ascaridia* infections were cured only after three months. When the medicated feed was given once a month for three years as a prophylactic measure, ascarids were absent. G.I.P.

(305q) Phenothiazine mixed with moistened grain and fed regularly to 100 foals (18 months to 2 years old) in a dose of 2 gm. per animal removed all *Alfortia* and *Delafondia* infections within three weeks, while trichonemiasis was greatly reduced. G.I.P.

(305r) Tracheal injection of aqueous iodine solution, repeated after 11 days and then after one month, gave good results against dictyocauliasis in calves. The treatment was followed by a change of pasture. G.I.P.

(305s) When, owing to its large size, a coenurus cyst causes attenuation of the skull in the occipital or parietal region in sheep, the following surgical method is advocated. Using a hypodermic syringe the liquid is withdrawn and 3 ml. of a 5-10% tincture of iodine are introduced. 94-95% of 164 sheep treated were cured. G.I.P.

(305t) Sichkov recommends Sidorova's method of dealing with coenuriasis in sheep [see abstract No. 305s above] but using only 1.0-1.5 ml. of the tincture of iodine. With this method or, preferably, 1.0-1.5 ml. of a 15-20% hexachloran solution, 90% of 185 sheep were cured. G.I.P.

(305u) In cattle there is itching in the area over a coenurus cyst in addition to the characteristic giddy movements which appear 58 days after infection. Four calves and two out of four sheep were cured by aspirating the fluid from the cysts by Tarasov's method. G.I.P.

(305v) *Opisthorchis* were found in the bile-ducts and eggs in the faeces of two out of seven rats which had eaten 5-6 kg. of heavily infected ide two weeks earlier. G.I.P.

305—Veterinariya (cont.)

- w. NEGRASH, A. K., 1956.—[A case of death of a young pig due to ascariasis.] [Abstract.] 33 (5), 47. [In Russian.]
- x. AKHMEDSHIN, M. A., 1956.—[Cysticercus infestation of sheep in the southern Transural.] [Abstract.] 33 (5), 47. [In Russian.]
- y. KHAZIEV, G. Z., 1956.—[Echinococcus infection in elk.] [Abstract.] 33 (5), 47. [In Russian.]
- z. RYAZANTSEV, V. F., 1956.—[The clinical picture of equine parascariasis.] [Abstract.] 33 (5), 47. [In Russian.]
- ba. RYAZANTSEV, V. F., 1956.—[The clinical picture of *Moniezia* infestation in sheep.] [Abstract.] 33 (5), 47–48. [In Russian.]
- bb. KLESOV, M. D. & POPOVA, Z. G., 1956.—[Prophylactic measures against *Dicrocoelium lanceatum* infestation in sheep.] 33 (6), 36–39. [In Russian.]
- bc. KRASTIN, N. I. & PUTILINA, V. P., 1956.—[Methods for the control of *Thelazia* infestation in cattle.] 33 (6), 40–41. [In Russian.]
- bd. AKRAMOVSKI, M. N., KATASHEVA, Y. E. & VOLKOVA, A. D., 1956.—[Sodium silicofluoride in *Parascaris* infestation of horses.] 33 (6), 41–43. [In Russian.]

(305w) A six-week-old piglet died from a 3 cm. split in the duodenum following the occlusion of the intestine by 289 *Ascaris*. A two-month-old piglet died of occlusion of the bile-duct by nine *Ascaris*. G.I.P.

(305x) *Cysticercus ovis* was present in 3.5% of slaughtered sheep from North Kazakhstan and the Chelibinsk region. The cysticerci were found in the heart, mostly under the pericardium, and only in two cases was general infection of the muscles observed. G.I.P.

(305bb) As poultry readily eat snails, including some of the larger gastropods, 300 young birds were put on four hectares of pasture on which the snail density was 47.2 per sq. m. and were grain fed, yet twenty days later 97.5% of the snails had been eaten. In the following year 70 uninfected lambs and a flock of sheep infected with *Dicrocoelium dendriticum* were put on 37 hectares which had been cleared of snails by 1,000 chickens. By September, only 6.3% of these lambs acquired infection, while 90 control lambs grazed on uncleared pasture had all become infected. In another experiment 10.8% of the lambs put on a pasture which had been cultivated for lucerne for two years to eliminate the snail population became infected. It is suggested that the 6.3% and 10.8% may have acquired their infection from previously grazing near the stabling. G.I.P.

(305bc) The Russian official instructions to examine the eyes of cattle for *Thelazia* monthly throughout the summer are considered to be useless and the irrigation of the conjunctiva ineffective against *T. skrjabini* and *T. gulosa*. A 0.5% aqueous lysol solution is cheaper against *T. rhodesii* than the 1:2,000 aqueous iodine solution recommended, while two treatments at a few days interval and with two irrigations each are more effective than successive irrigations. G.I.P.

(305bd) The effective and non-toxic dose of sodium silicofluoride used for parascariasis was 0.03 gm. per kg. body-weight for foals and 0.04–0.08 gm. per kg. for horses. It was given with moistened oats, after a 12-hour starvation diet, and the animals were kept without food or water during the following four hours. Only six out of 64 foals and four out of 179 horses required a second treatment after ten days. G.I.P.

306—Veterinary Extension Quarterly. University of Pennsylvania Bulletin.

- a. MARTIN, H. M., 1956.—“Methods employed in the screening of chemical compounds for anthelmintic qualities.” No. 143, pp. 114–129.

(306a) Martin passes under review the various factors which have to be considered in the search for new anthelmintics, e.g. the great variety in the morphology, physiology, habitats and behaviour of helminths, the solubility, mode of administration, safety and cost of the drugs, the effect of synergism, the various types of screening tests *in vitro* and *in vivo* and bio-assay, and the employment of dilution egg-counts, the critical tests of Hall *et al.* and clinical appraisal tests to confirm preliminary estimates of anthelmintic value. R.T.L.

307—Veterinary Medicine.

- a. SHUMARD, R. F. & EVELETH, D. F., 1956.—“Further studies on the anthelmintic action of piperazine citrate.” 51 (11), 515–517.
- b. SHELTON, G. C., RODABAUGH, D. E. & ELDER, C., 1956.—“Some results of phenothiazine as a means of controlling gastrointestinal parasites of calves.” 51 (12), 551–555.

(307a) This report on laboratory tests and field trials with piperazine citrate in poultry and pigs shows that the addition of 1,000 mg. per gallon to drinking water is highly effective in preventing the establishment in poultry of *Ascaridia galli*, and that 2,000 and 4,000 mg. per gallon has a high anthelmintic efficiency. The addition of 4,000 mg. per gallon was apparently successful in removing *Ascaridia* spp. from a flock of turkeys. Single doses of 170, 270, 430 and 730 per kg. body-weight given to pigs removed *Ascaris lumbricoides*, and the addition of 8,000 mg. per gallon of water in a slop mixture for a single feed was also effective. R.T.L.

(307b) Details are given of a series of experiments on calves artificially infected with larvae of gastro-intestinal helminths which show that the effect of phenothiazine on the egg-laying capacity of worms of different genera varies, but that the total egg output and the prepatent period was not altered. Young dairy calves with moderate infections made slightly better gains in weight when 1.5 gm. to 2 gm. of phenothiazine were added to a daily grain ration. The amount of infection acquired on pasture was considerably less when older animals on the same pasture also received low level phenothiazine in the feed. R.T.L.

308—Veterinary Record.

- a. DORSMAN, W., 1956.—“Fluctuation within a day in the liver-fluke egg-count of the rectal contents of cattle.” 68 (34), 571–574.
- b. MICHEL, J. F. & PARFITT, J. W., 1956.—“An experimental study of the epidemiology of parasitic bronchitis in calves.” 68 (41), 706–710.
- c. MORGAN, D. O. & SOULSBY, E. J. L., 1956.—“New records of nematodes in British cattle.” 68 (51), 1029.

(308a) The faeces of five heifers, viz., two housed and three at pasture, were collected at intervals of one hour and examined for *Fasciola hepatica* eggs. There was a gradual rise in the number of eggs per gramme during the morning until 1.30 p.m., which declined during the afternoon and remained constant at the minimum from 8.30 p.m. until 7.30 a.m. These fluctuations indicate that for the diagnosis of subclinical infections faecal samples should be taken from the rectum about mid-day. R.T.L.

(308b) An experiment is described in which a paddock contaminated with *Dictyocaulus viviparus* was grazed by 24 susceptible calves, one being introduced every five weeks. Observations were made on faecal larval counts and post-mortem worm counts and these were compared with herbage larval counts. The influence of faecal larval output over herbage larval counts was variable but resulted in a seasonal rise in autumn, late spring and early summer. The mean herbage larval count of the first nine days of pasturage was inversely proportional to the total number of days a calf was on pasture prior to death, and when the mean was less than one larva per pound of herbage all of six calves survived. J.W.G.L.

(308c) Morgan & Soulsby list the nematode parasites of cattle in Britain, including three new British records, *Cooperia macmasteri*, *C. punctata* and *Nematodirus helvetianus*. R.T.L.

309—Vlugschrift voor de Landbouw. 's-Gravenhage.

- a. ANON., 1956.—“Als de leverbot uw koeien en schapen bedreigt.” No. 72, 8 pp.

(309a) This Netherlands Ministry of Agriculture leaflet is addressed to farmers. It points out the serious consequences of liver-fluke infection in sheep and cattle, which is very common in the Netherlands, and gives an account of the life-cycle of the parasite and its control by

land drainage, destruction of snail intermediaries (spraying with DNC is recommended) and of the symptoms of the disease. Treatment of infected animals must be in the hands of a veterinary surgeon.

A.E.L.

310—West African Medical Journal.

- a. ONABAMIRO, S. D., 1956.—“The effects of hetrazan (banocide), diethylcarbamazine on the larval forms of *Dracunculus medinensis*.” 5 (2), 64–70.

(310a) Hetrazan in a solution of between 10% and 20% is toxic to the infective larvae of the guinea-worm enclosed within its cyclops intermediate host. The embryos freshly discharged from the adult worm are much more resistant.

R.T.L.

311—Wiadomości Parazytologiczne. Warsaw.

- a. WAWRZYŃSKI, E., DZIĘCIOŁOWSKI, Z. & KUŹMICKI, R., 1956.—“Tolerancja ustroju przy leczeniu atebryną chorób pasożytniczych przewodu pokarmowego.” 2 (6), 357–365. [English & Russian summaries p. 365.]
 b. RYBICKA, K., 1956.—“O pracy Szulca i Dawtiana ‘Problem specyficzności układu żywicieli-pasożyta’.” 2 (6), 367–372. [English & Russian summaries p. 372.]
 c. CZAPLIŃSKI, B., 1956.—“Bruzdogłowcowa anemia złośliwa na tle pracy Bertel von Bonsdorffa.” 2 (6), 373–379.

(311a) Before administering atebrian it is important to give sugar and vitamin C to increase the detoxication properties of the liver and adrenal glands.

R.T.L.

(311b) In a critical summary of Shults & Davtyan's paper (1955) on the “Problem of the specificity of host-parasite relations”, Rybicka points out that the question of specificity is not fully illuminated when it is treated only from the physiological aspect and the many ecological factors are omitted.

R.T.L.

(311c) Czapliński recounts the work by von Bonsdorff on the pernicious anaemias caused by *Diphyllbothrium latum* in man [for abstract see Helm. Abs., 25, No. 14e].

G.I.P.

312—Year Book. Institute of Inspectors of Stock of New South Wales.

- a. GEE, C. D., 1956.—“A drenching programme for sheep. Mid-western areas of N.S.W.” Year 1956, pp. 51–52.
 b. CHARLES, G., 1956.—“Liver fluke infestation(?). An unusual syndrome.” Year 1956, pp. 53–54.
 c. GEE, C. D., 1956.—“Liver fluke. Control with copper sulphate.” Year 1956, pp. 55–57.
 d. FARLEIGH, E. A., 1956.—“Stomach worm infestation.” Year 1956, pp. 58–59.
 e. FARLEIGH, E. A., 1956.—“Hydatid disease.” Year 1956, pp. 72–73.

(312a) Gee submits a chart for the drenching of sheep in the central west of New South Wales. As a healthy sheep should grow two lb. more wool than one that is worm-infested, four or five drenches, at about 2/- per sheep annually, should be a sound economic proposition.

R.T.L.

(312c) On a property in New South Wales liver-fluke infection in sheep has been reduced to a low level and is now seldom seen at autopsy. This has been effected by spraying the sides of creeks and small tanks with 10% copper sulphate solution twice yearly, in autumn and in spring, using a Land Rover with a power take-off operating a fire-fighting spray unit. The cost in bluestone and labour was £80 for 15 acres actually sprayed or an annual cost

of eleven pence per acre of country kept free from fluke. This compares favourably with the cost of drenching with carbon tetrachloride and avoids the heavy losses associated with this treatment.

R.T.L.

(312d) Farleigh emphasizes the folly of returning sheep to old paddocks after drenching for *Haemonchus contortus* infection.

R.T.L.

(312e) In a recent survey, hydatid was found at abattoirs in southern New South Wales in 40% of 300,000 sheep, 30% of 30,000 cattle and 5% of 5,000 pigs; the condemnations represented a loss of over £600,000 per annum. *Echinococcus granulosus* occurred in 25% of the dogs in the area.

R.T.L.

313—Zeitschrift für Angewandte Zoologie.

- a. SPREHN, C. & HAAKH, U., 1956.—“Zur Morphologie des Waschbärenspulwurmes und zu seiner Stellung im System.” Year 1956, No. 1, pp. 95–102.
- b. BOCH, J., 1956.—“Knötchenwurmbefall (*Ternidens deminutus*) bei Rhesusaffen.” Year 1956, No. 2, pp. 207–214.

(313a) *Ascaris procyonis* which Stefański & Żarnowski, 1951, found in the intestine of *Procyon lotor* is redescribed, figured and transferred to *Toxascaris* as *T. procyonis* n.comb.

R.T.L.

(313b) A search for *Ternidens deminutus* in more than 30 monkeys, *Macacus cynomolgus*, showed that the presence of mature *T. deminutus* in the gut lumen seemed to inhibit the emergence of the fourth-stage larvae from their nodules, driving them deeper into the serosa. Larvae emerged only if the adults died or were eliminated therapeutically. This phenomenon is probably immunological.

M.MCK.

314—Zeitschrift für Parasitenkunde.

- a. SZIDAT, L., 1956.—“Geschichte, Anwendung und einige Folgerungen aus den parasitogenetischen Regeln.” 17 (4), 237–268.
- b. SCHUMACHER, W., 1956.—“Untersuchungen über das Eindringen der Jugendformen von *Fasciola hepatica* L. in die Leber des Endwirts.” 17 (4), 276–281.
- c. SUPPERER, R., 1956.—“Beitrag zur Kenntnis der Widerstandskraft von Lungenwurmlarven des ersten Stadiums.” 17 (4), 298–299.
- d. THEMANN, H., 1956.—“Die experimentelle Rattentrichinose unter dem Einfluss von Calciumbehandlung.” 17 (4), 300–329.

(314a) Szidat presents a detailed analysis of the “biological laws” and “parasitogenetic rules” formulated by Ihering, Fahrenholz, Szidat, Eichler and Janicki (all of which are more or less based on Bojanovsky's doctrine of the supreme importance of the environment) and of their application to the study of affinity and of problems in zoogeography. He concludes that parasites are subject to exactly the same conditions as free animals, except that, in the case of the former, the “environment” is the host itself. From the degree of organization of parasites conclusions can be drawn as to the phylogeny of their hosts. Great care must be taken, however, since some parasites are non-specific and others do not show clear parallel development. Conclusions should not be drawn from the examination of one species of parasite only: if possible the whole parasitic fauna of the host should be critically studied.

A.E.F.

(314b) Schumacher has examined histologically an infected guinea-pig in order to determine the precise way in which the liver is invaded by young *Fasciola hepatica*. The guinea-pig was killed 64 hours after infection with 1,000 *F. hepatica* cysts. The abdominal cavity was washed out and 83 flukes recovered: portal vein, main bile-ducts, and gall-bladder were negative. In a series of sections of the left lobe of the liver 13 *F. hepatica* were counted.

Five photomicrographs show the various stages of penetration, starting at the point of entry from which the flukes bore their way through the liver until the fluke finally penetrates sideways into the liver tissue. That liver-flukes follow the route of earlier invaders is shown by the fact that in one case two flukes, and in another four, were found in the same tunnel. A.E.F.]

(314c) Supperer is able to give conclusive evidence of the overwintering, in spite of very severe weather, of *Protostrongylus sagittatus* out-of-doors in Austria. Red deer droppings of the previous day were found on 1st January 1954 to contain about 35 to 40 *P. sagittatus* larvae in each ball of faeces examined. When a further sample of these same droppings was examined on 28th March 1954—it having been definitely established that no red deer had visited the spot in the meantime—the same number of fully motile larvae was found per ball of faeces, and this in spite of the fact that January and February had, between them, frost on 51 days (on 21 of them a temperature of below $-10^{\circ}\text{C}.$). On 21st April 1954 larvae were still present and, although there had been much rain, had not migrated from the faeces. By 10th May 1954 the number of larvae had decreased and on 12th July 1954 one larva only was recovered and the faeces were largely decomposed. A.E.F.]

(314d) Themann has carried out a series of experiments on 700 rats in order to determine the effect of calcium (i) on the early acute stage of trichinelliasis, and (ii) in hastening calcification. The preparation used was Calciduran, containing primary sodium phosphate, secondary calcium phosphate, calcium citrate, citric acid, and vitamins C and D₂. Calciduran had no effect on the acute stage of trichinelliasis; the failure was perhaps due to the fact that the effective principle was present in too weak a form to influence such a toxic and allergic condition. Although Calciduran had a marked effect in speeding up calcification of the capsules—the stage was reached in three months instead of the normal seven months after infection—calcification of encysted *Trichinella* larvae was not achieved. Themann also gives details of the pathology of trichinelliasis in rats and shows that, contrary to what is generally believed, rats are not more sensitive than other animals to *Trichinella* infection. A.E.F.]

315—Zeitschrift für Tropenmedizin und Parasitologie.

- a. BUCK, A. A. & UHRMANN, G., 1956.—“Untersuchungen über den Befall mit *Echinostoma lindoense* und *Schistosoma japonicum* bei der Bevölkerung des Lindusees (Mittelcelebes).” 7 (1), 110–116. [English summary p. 116.]
- b. SZIDAT, L., 1956.—“Über den Entwicklungszyklus mit progenetischen Larvenstadien (Cercariae) von *Genarchella genarchella* Travassos 1928 (Trematoda, Hemiuridae) und die Möglichkeit einer hormonalen Beeinflussung der Parasiten durch ihre Wirtstiere.” 7 (2), 132–153. [English summary p. 152.]
- c. KOLLERT, W. F., 1956.—“Die Behandlung der Blasenbilharziasis westafrikanischer Schulkinder mit Miracil D.” 7 (2), 153–162. [English summary p. 162.]
- d. WAGNER, W. H., 1956.—“Modellinfektionen in der experimentellen Chemotherapie der Filariosen.” 7 (2), 163–177. [English summary p. 174.]

(315a) In three villages on the shores of Lake Lindu, Central Celebes, a total of 123 inhabitants was examined for helminths. The numbers positive were: *Echinostoma lindoense*, 80; *Schistosoma japonicum*, 32; *Ancylostoma duodenale*, 41; *Ascaris lumbricoides*, 13. The first intermediary for *E. lindoense* in this district is *Anisus sarasinorum* and the second either *Corbicula lindoensis* (a mussel much eaten by the natives) or *Viviparus japonicus*. The local intermediary for *Schistosoma japonicum* has not yet been established. The low incidence of *Ascaris* may be due to the isolation of the villages and/or to antagonism between *Echinostoma* and *Ascaris*. A.E.F.]

(315b) The life-cycle of the hemiurid *Genarchella genarchella* in the mollusc *Littoridina australis* is greatly abbreviated. The cercarial stage is suppressed and mature metacercariae which produce numerous eggs containing miracidia are found within the redia. There is therefore no second intermediate host. Passage of the metacercariae into the definitive host *Salminus maxillosus* is not obligatory. The shortening of the life-cycle in this, and certain other platyhelminths, is attributed by Szidat to the excess production of hormones by their cypriniform fish hosts when these adapted themselves from sea water to fresh water in an early geological period. R.T.L.

(315c) Miracil-D in dragées containing 0.2 gm. was given twice daily to 65 West African children, suffering from vesical schistosomiasis, up to a total of 100 mg. per kg. body-weight. With few exceptions no schistosome eggs were found three months after treatment but the drug usually caused loss of appetite, nausea, vomiting, headache and other nervous symptoms. The best method of administration was to extend the period of treatment over six to ten days and to begin and end with smaller doses. R.T.L.

(315d) The various screening tests for filaricidal chemicals which have been made in animals and *in vitro* are reviewed and the titles of the papers in which they appeared are listed. Although the results may serve as useful pointers they should be applied to human filariasis with caution. R.T.L.

316—Zeitschrift für Zellforschung und Mikroskopische Anatomie.

- a. WESSING, A., 1956.—“Untersuchung über das Vorkommen der Ribonukleinsäure (RNS) bei der Stammform und bei einer Dauermodifikation des Nematoden *Rhabditis anomala* P. Hertwig.” 44 (1), 101-120.

(316a) Wessing has studied the occurrence and behaviour of ribonucleic acid in the sex cells of *Rhabditis anomala*. He describes the differences in this regard between the original strain of the worm and a modified form which developed after culturing for two years in the laboratory. The intensity of ribonucleic acid storage in the cytoplasm of *R. anomala* is dependent on the food intake of the worm. A.E.F.

317—Zentralblatt für Bakteriologie, Parasitenkunde, Infektionskrankheiten und Hygiene. Abteilung I. Originale.

- a. BÖHM, L. K. & SUPPERER, R., 1956.—“Beiträge zur Kenntnis tierischer Parasiten. II.” 167 (2), 170-177.

(317a) Böhm & Supperer redescribe *Corrigia skrjabini* from the pancreatic duct of a new host *Tetrao urogallus*. The orang utan *Pongo pygmaeus* is a new host for *Tetrathyridium* sp. *Protostrongylus tauricus* is now reported from Austria in *Lepus europaeus*. A seven-week-old lamb born in mid-winter near Zwettel, which had been passing mature tapeworm proglottides, had four large specimens of *Moniezia expansa*. Thirty-three of the 38 lambs in the same flock born at the same time had also died, probably from the same infection. Acquirement of *Moniezia* infections in winter has not previously been recorded. The oribatid mite vectors must have overwintered in the top of the frozen soil or on plants, to be accessible to young lambs. A piece of lion skin (*Felis leo*), with numerous vesicles filled with blood and lymph, and with the hairs encrusted with blood, contained large numbers of [undiagnosed] thick-shelled embryonated eggs, $63-68\mu \times 46-53\mu$ and free larvae, $162-164\mu \times 9.5\mu$ thick, which showed no internal differentiation. M.MCK.

318—Zentralblatt für Veterinärmedizin.

- a. TEUSCHER, E., 1956.—“Une méthode permettant de préciser la forme des oeufs de Strongyloidea chez les ruminants.” 3 (3), 247–258. [English, German & Spanish summaries pp. 257–258.]
- b. BOCH, J., 1956.—“Zur Frage der Resistenz und Immunität der Wiederkäuer gegenüber parasitischen Würmern.” 3 (4), 402–418. [English, French & Spanish summaries pp. 415–417.]

(318a) Recognition of the eggs of bursate nematodes in the faeces of domestic stock is made on their size and shape, thickness of shell, stage of development and colour of their contents. The mean values of length and breadth, often given, are of no value. Teuscher divides the various shapes of the eggs into four main groups, viz., (i) those in which both the vertical and the horizontal axes are symmetrical, including those theoretically spherical, (ii) those symmetrical about the horizontal axis, (iii) those symmetrical about the vertical axis, but more or less flattened on one side and (iv) those which are asymmetrical. In each of the first three groups several types of variation are recognized. Photographs illustrate eggs of these various categories. After an egg has been classified into one of the variations of any of these four groups its species can be diagnosed with practice. R.T.L.

(318b) From an extensive study of the occurrence of natural and age resistance in large numbers of cattle of various breeds and of sheep and deer, Boch reaches the following conclusions: (i) *Fasciola hepatica* and *Moniezia* developed equally well in domesticated animals of all ages and breeds, (ii) the defence mechanism against lungworms was apparently better in cattle than in sheep and game, (iii) ruminants generally were able to develop an acquired immunity against stomach worms from repeated small super-infections although breed and age resistance were not demonstrated. This immunity depressed the pathogenicity but did not affect the life of the worms. The hosts became silent carriers and the eggs they excreted on the pastures were a source of danger to young stock. Feeding and management play an important role in the unstable equilibrium between host and parasite. R.T.L.

319—Zoologicheskii Zhurnal.

- a. GARKAVI, B. L., 1956.—[The propagation and natural foci of the *Streptocara* nematodes of ducks.] 35 (3), 376–378. [In Russian: English summary Suppl. p. 6.]
- b. FEDOROV, V. G., 1956.—[Studies of the influence of oxygen, low temperatures and chloramine on the development and vitality of *Diphyllobothrium latum* L. (Cestoidea).] 35 (5), 652–656. [In Russian: English summary Suppl. p. 4.]

(319a) An outbreak of streptocariasis is reported on a poultry farm in Western Siberia, where a high percentage of the wild birds are naturally infected. The geographical distribution of *Streptocara crassicauda* is correlated with the seasonal migration from Western Siberia to the areas where the birds spend the winter. R.T.L.

(319b) The eggs of *Diphyllobothrium latum* retain their vitality under anaerobic conditions for 6·5 months. Some attain the coracidium stage even after 12·5 months. The eggs were killed when kept for 30 days at +2°C. to +6°C. and +4°C. to +8°C. in a refrigerator, and were destroyed in 6 hours when kept at –1°C. to –2°C. 18·1% to 24·4% of the eggs developed after 72 hours in chloramine. R.T.L.

320—Zoologischer Anzeiger.

- a. FRENZEN, K., 1956.—“Beitrag zur Morphologie und Synonymie von *Ascaridia galli* Schrank 1788.” 156 (3/4), 55–65.

(320a) There are differences between the proportions of the body and the form and structure of the top of the spicule of specimens of *Ascaridia galli* obtained from poultry from Melbourne and Adelaide and others collected in Germany, Indonesia and Pakistan. These

re plotted on graphs. From a comparison of the type specimens of *A. compressa* Schneider, 1866, which came from Adelaide, with *A. galli* Schrank, 1788, from the same locality, Frenzen concludes that they belong to the same species and that *A. compressa* falls into the synonymy of *A. galli*.
M.MCK.

NON-PERIODICAL LITERATURE

- 321—FEDYUSHIN, A. V., 1956.—[How to protect domestic birds from helminth infections.] Moscow: Gosudarstvennoe Izdatelstvo Selskokhozyaistvennoi Literaturi, 56 pp. [In Russian.]

This booklet, written for the layman on farms, gives general outlines of the more important helminth infections of chickens.
G.I.P.

- 322—IBARRA CANTU, M. E., 1956.—“Alteraciones hemáticas e histológicas en ratas infestadas con *Ascaris lumbricoides* var. *suum*.” Thesis, Escuela Nacional de Ciencias Biológicas, Mexico, 51 pp.

Each of 32 white rats was given about half a million embryonated eggs of *Ascaris lumbricoides* var. *suum* and autopsied one to 14 days later. An initial increase in the percentages of erythrocytes and haemoglobin, possibly correlated with growth, occurred in 12 young rats. In animals examined more than three days after infection these percentages had progressively decreased. Leucocyte and eosinophil counts tended to increase. The blood counts are graphed and the pulmonary and hepatic lesions are described and tabulated. In rats killed six days after infection the liver presented fibrous nodules in varying stages of development; after eight days an *Ascaris* larva was found in the lung and after ten days there were pneumonic foci and local collapse of the alveoli.
M.MCK.

323—INTERNATIONAL CONGRESS OF ZOOLOGY (14th), Copenhagen, August 5-12, 1953.

- a. SZIDAT, L., 1956.—“Der marine Charakter der Parasitenfauna der Süßwasserfische des Stromsystems des Río de la Plata und ihre Deutung als Reliktfäuna des tertiären Tethys-Meeress.” Proceedings, pp. 128-138. [Discussion p. 138.]
- b. DOUGHERTY, E. C. & NIGON, V., 1956.—“The effect of ‘acriflavine’ (a mixture of 2,8-diaminoacridine and 2,8-diamino-10-methylacridinium chloride) on the growth of the nematode *Caenorhabditis elegans*.” Proceedings, pp. 247-248. [Discussion pp. 248-249.]
- c. NOUVEL, J., 1956.—“Quelques aspects de la parasitologie des animaux de parcs zoologiques.” Proceedings, pp. 338-339. [Discussion pp. 339-340.]
- d. ROTH, H. & MADSEN, H., 1956.—“Die Trichinose in Grönland, abschliessender Bericht der Jahre 1948-1953.” Proceedings, pp. 340-341. [Discussion p. 341.]
- e. BRINKMANN, Jr., A., 1956.—“Demonstration of monogenetic fish trematodes, mainly from Norwegian waters, with some comments.” Proceedings, pp. 345-346. [Discussion p. 346.]
- f. EUZET, L., 1956.—“Suggestions pour une nouvelle classification des cestodes tétraphyllides.” Proceedings, pp. 347-349. [Discussion p. 349.]
- g. STAMMER, H. J., 1956.—“Die Parasiten der Bibioniden.” Proceedings, pp. 349-358.
- h. BIKHOVSKAYA-PAVLOVSKAYA, I. E., 1956.—“La variabilité des signes morphologiques et son importance dans la classification des trématodes.” Proceedings, pp. 363-364.
- i. DOLLFUS, R. P., 1956.—“Présence du genre *Atalostrophion* G. A. Mac Callum 1915 (Trematoda Digenea) sur la côte Atlantique du Maroc.” Proceedings, pp. 364-366. [Discussion p. 367.]
- j. STEINER, G., 1956.—“The zoological and agricultural status of plant nematodes.” Proceedings, pp. 368-369. [Discussion pp. 370-371.]
- k. GOFFART, H., 1956.—“Ergebnisse einer Resistenzprüfung knollenbildender *Solanum*-Arten gegenüber *Heterodera rostochiensis* Wt.” Proceedings, p. 372. [Discussion p. 373.]
- l. ELLENBY, C., 1956.—“The hardening of the cyst wall of the potato root eelworm.” Proceedings, p. 373. [Discussion pp. 373-374.]

- m. OOSTENBRINK, M., 1956.—"Soil sample examination as a base for advisory work on eelworm diseases in crops." Proceedings, pp. 374-375. [Discussion p. 375.]
- n. PITCHER, R. S. & CROSSE, J. E., 1956.—"An etiological association between nematode (*Aphelenchoides* spp.) and *Corynebacterium fascians* in strawberry disease." Proceedings, p. 380. [Discussion p. 377.]
- o. STEINER, G., 1956.—"The problem of the taxon in the nematode genus *Ditylenchus* and its agricultural implications." Proceedings, pp. 377-378. [Discussion pp. 378-379.]
- p. HOMEYER, B., 1956.—"Eine fluoreszenzoptische Methode zur Unterscheidung lebender und toter Nematoden." Proceedings, pp. 379-380. [Discussion p. 381.]
- q. GADEA, E., 1956.—"Freeliving nematodes of the high mountains of Spain." Proceedings, pp. 381-382.
- r. STOLL, N. R., 1956.—"Axenic cultivation of the parasitic nematode, *Neoalectana glabra* Steiner, 1929, in fluid media." Proceedings, p. 382.
- s. HUBENDICK, B., 1956.—"Observations on the occurrence of *Oncomelania quadrasi* Mölle, 1907, the host-snail of *Bilharzia* in the Philippines." Proceedings, pp. 511-512.

(323a) The trematode fauna of fresh-water fishes of the La Plata River System is purely marine in character and quite unlike that of Brazil. Although there are numerous species Allocreadiidae, Heterophyidae, Hemiuridae, and especially of Haploporidae, belonging genera which occur in fishes in the Mediterranean and the Caribbean Seas, they are not to be considered as recent immigrants from the Atlantic but as relics of the marine fauna of arms of the ancient Tethys Sea, which, in early times, filled the La Plata, Paraná-Paraguay and Amazon Systems. While the marine fishes, especially Characinidae and Siluridae, have undergone rapid evolutionary changes in the new fresh-water environment their parasites have evolved more slowly and still show genuine marine characters. Several trematodes are figured with n.sp. legends [but they had been named and described by Szidat in *Rev. Invest. Mus. argent. Cienc. nat., Cienc. zool.*, 1954, **3**, 1-85, except that *Saccocoelioides magnus* n.sp. now appears as *S. maior* n.sp.].

R.T.L.

(323b) In experiments in which adult hermaphrodite *Caenorhabditis elegans* were allowed to lay eggs on peptone-lecithin-mineral agar medium containing 1:1,000 acriflavine the larvae failed to reach maturity. If transferred after three days to normal medium the larvae usually failed to mature although some survived as immature forms for over 35 days. As acriflavine is fixed by nucleic acids synthetic processes dependent on these acids may have been inhibited. Adults are killed in 48 hours by acriflavine at 1:250, in five days by 1:500 and in six days by 1:1,000, but larvae may survive in 1:1,000 for over a month.

R.T.L.

(323c) The trematodes of zoo animals are usually those acquired before, and not after, capture because the complex life-cycles are broken during captivity. Cestodes and nematodes have simpler cycles and may be acquired during captivity. In the discussion Baer showed by examples that zoo directors could profitably consult parasitologists before allowing indiscriminate contaminations between animals.

M.MCK.

(323d) The results of investigations by Roth and others from 1948 to 1953 on the incidence of *Trichinella* infections in animals in Greenland are tabulated and discussed. Infection was found in 586 (61.4%) of 945 dogs, 58 (23.5%) of 247 polar bears, *Thalarctos maritimus*, 25 (1.6%) of 1,591 Arctic foxes, *Alopex lagopus*, 5 (0.8%) of 481 walruses, *Odobenus rosmarus*, 2 of 234 bearded seals, *Erignathus barbatus*, 1 of 1,561 seals, *Phoca hispida*, 1 of 1,657 unspecified seals and, in museum material, two out of four polar wolves. Infection was not detected in 53 unicorn whales or 228 white whales. Amphipods may act as transfer hosts, which would explain the wide-spread, if relatively rare, infection of seals and walruses. Trichinosis infection is circumpolar and extends to the northernmost Arctic.

M.MCK.

(323e) Commenting on Brinkmann's demonstrations of monogenetic fish trematodes Baer suggested that the large ovary and the presence of only a single egg in the specimen of *Leptocotyle minor* exhibited might be due to polyploidy.

R.T.L.

(323f) It is suggested that the tetraphyllids should be divided into three new superfamilies, viz., (i) Phyllobothriides n.superf., comprising Phyllobothriidae and Onchobothriidae; these have four pedunculate or sessile bothridia which are simple or septate and sometimes have hooks, the gonopores are lateral and the vitellaria lie in two lateral zones: (ii) Lecanicephalides n.superf., comprising Lecanicephalidae and Cephalobothriidae; the scolex has four small suckers and a very large apical organ which is more or less retractile and sometimes divided into tentacles; the gonopores are lateral, the vitellaria lie in two lateral zones and the segments are apolytic: (iii) Prosobothriides n.superf., containing Prosobothriidae, Phoreiobothriidae and Disculicepitidae; there are either four simple bothridia provided with a pair of compound hooks, or four glandular pads. The scolex and strobila are covered with characteristic long, flat spines, the gonopores are lateral and the vitellaria form a tube around the medullary parenchyma. M.MCK.

(323g) While examining about 1,500 bibionid larvae and 100 imagines near Erlangen, Stammer found wide-spread infections with *Bradynema bibionis* Wachek, 1955. The species infected were *Philia febrilis* (= *Dilophus vulgaris*), *Bibio clavipes*, *B. fulviventris*, *B. hortulanus*, *B. johannis*, *B. laniger* and *B. varipes*. Incidence was nearly 50% in some localities. The fertilized nematode bores into the young larval host and lays eggs which develop into larvae. Older females in older larval hosts are viviparous. When the host reaches the imago stage the nematode larvae emerge and live free, developing into males and females. *Neoapectana bibionis* was found in dead larvae, pupae and imagines of *B. fulviventris*, *B. laniger* and *B. varipes* and on a dead carabid *Pardileus calceatus*; Osche examined these nematodes and found numerous forms intermediate between *N. bibionis* and *N. affinis*. The latter is therefore considered a synonym. Undetermined young mermithids were found in two larvae and four imagines of *B. laniger*. M.MCK.

(323h) In 900 specimens of *Leucochloridium* from 30 species of birds the posterior extension of the vitellaria, the position of the uterus relative to the inter-caecal space and the relative arrangement of the genital glands were constant features. Characters too variable to be diagnostic were: the position of the oral sucker, ratio of the dimensions of the pharynx, thickness of the intestinal branches, anterior limit of the vitellaria, shape of the genital glands and their distance from one another and their relative or absolute dimensions. M.MCK.

(323i) Dollfus describes and figures [without a differential diagnosis] *Atalostrophion orbitarium* n.sp. from the orbital cavity of the fish *Ruvettus pretiosus* from the Atlantic coast of Morocco. He recalls that Ishii (1935) subdivided *Atalostrophion* into two subgenera, *Atasparganum* and *Maccalozoum* but the former name is unacceptable as this subgenus contains the generic type and should therefore be called *Atalostrophion*. M.MCK.

(323j) Steiner states that the plant-parasitic nematodes are found in the Tylenchoidea and Dorylaimoidea, the former with a stomatostyle the latter with an odontostyle. In the Tylenchoidea digestion may be extra-oral, the plant reacting by forming nectarial cells or in other ways. Both endoparasitism and ectoparasitism occur in Tylenchoidea; endoparasitism is rare in Dorylaimoidea. Anabiosis, sexual dimorphism and greater egg production are characteristic of the former group, suggesting that plant parasitism is of older status there than in Dorylaimoidea. J.B.G.

(323k) Goffart describes tests for resistance to *Heterodera rostochiensis* in certain *Solanum* species. *S. vernei*, *S. andigenum* and crosses between *S. vernei* and *S. tuberosum* showed resistance and so provide the possibility of producing a resistant variety of potato. J.J.H.

(323l) In a histochemical investigation of the hardening of the cyst wall of the potato root eelworm *Heterodera rostochiensis*, the author found that the tanning process begins in the outer of the two regions which comprise the cyst wall. If the regions are separated the tanning process proceeds independently in each. J.J.H.

(323m) Soil sampling for prognosis of eelworm disease of crops can only be efficient if the eelworm is a wide-spread pathogen and is identifiable. Its host plants and the number which cause crop damage must be known. Systematic surveys normally reveal unexpectedly wide distribution. A bulk sample of 1 kg. of soil (the total of fifty small samples) is generally sufficient to represent one hectare. The modified Fenwick can may be used for collecting *Heterodera* cysts and a refined model of this apparatus will collect free-living nematodes. J.J.H.

(323n) [This is a summary of a paper, delivered at Copenhagen, which is essentially the same as that published by Crosse & Pitcher in *Ann. appl. Biol.*, 1952, **39**, 475-486. For abstract see *Helm. Abs.*, **21**, No. 331d.]

(323o) Steiner states that the bulb or stem nematode is not a single species *Ditylenchus dipsaci* but a complex of taxa. He claims that the differences between biological strains are supported by morphological features of which he showed slides. [No figures are given.] J.B.G.

(323p) Homeyer describes his technique for distinguishing dead and living nematodes. [For abstracts of previous papers see *Helm. Abs.* **22**, Nos. 236a, 238a and 474a.] J.J.H.

(323q) Gadea has collected nematodes from such biotopes as calcareous soils, siliceous soils, forest soils, peat moss cushions, granite and gneiss soils, and moss soils at altitudes from 1,000 to 3,000 m. in various mountain ranges of Spain. He gives lists of the species found in the Pyrenees, the Cantabrian mountains, the Sierra de Guadarrama, the Iberian mountains and the Sierra de Ronda and concludes that the nematode fauna there is similar to those of other European mountains. J.B.G.

(323r) Dauerlarvae of *Neoaplectana glaseri* had been cultured axenically from 1944 to 1951 and were still capable of infecting *Popillia japonica*. The eelworm was cultured successfully in veal or beef heart infusion broth with 1% peptone, together with raw liver extract added at pH 4.5-6.5 when great multiplication occurred. J.B.G.

(323s) *Oncomelania quadrasi* is now colonizing parts of the Panguil Bay area of northern Mindanao which were cleared from forest a few years ago and in similar districts in south-eastern and central Mindanao. It is suggested that *O. quadrasi* was originally a forest snail and that schistosomiasis japonica was present in the forested areas before the modern colonization. In rice-planted areas the snails are chiefly present in the ditches and creeks and can only maintain themselves within the paddy fields with difficulty. Properly arranged drainage and irrigation would probably contribute to the elimination of the disease from the Philippines. R.T.L.

324—MÖNNIG, H. O., 1956.—“Veterinary helminthology and entomology.” London: Baillière, Tindall & Cox, 4th edit. revised by G. Lapage, xv+511 pp.

325—UNITED STATES DEPARTMENT OF AGRICULTURE, 1956.—“Index-catalogue of medical and veterinary zoology. Supplement 6. Authors: A to Z.” Washington, D.C.: U.S. Government Printing Office, pp. 1375-1787.

326—YAMAGUTI, S., 1956.—“Studies on the helminth fauna of Japan. Part 50. Cestodes of birds, III.” Okayama: S. Yamaguti, 23 pp.

Fourteen cestodes are described from birds in Japan. Of these, eleven are new, viz., (i) *Dilepis orientalis* n.sp. from *Turdus a. aureus* is closely related to *D. turdi* but it has a double row of 28 hooks up to 72μ long. (ii) *Amoebotaenia yamasigi* n.sp. from *Scolopax rusticola* distinguished by the small size of the strobila, 1–1.2 mm. in length. There are only three to five segments. The large rostellar hooks are $75\text{--}84\mu$ long. The testes occupying the posterior intervacular field number six to ten. (iii) *A. awogera* n.sp. from *Picus a. awokera* is similar to *A. brevicollis* in shape and size of the rostellar hooks and in the cirrus armature [but no differential diagnosis is given]. (iv) *Anomotaenia binzui* n.sp. from *Anthus hodgsoni borezowskii* differs from *Anomotaenia trapezoides* as the length of the strobila is 25 mm. or over and the 1–16 testes are massed in one layer at the posterior half of the intervacular medulla while the anterior testes extend to the posterior end of the ovary. (v) *Bancroftiella toratugumi* n.sp. from *Turdus a. aureus* is formally described from a single immature specimen. The uterus is unknown but from other characteristics it seems to belong to *Bancroftiella* and is the first species of this genus in Turridae. (vi) *Gryporhynchus nycticoracis* n.sp. from *Nycticorax nycticorax* differs from *G. cheilancristrotus* in having four testes and the atrial hooks are 3μ long by 15μ at the base. (vii) **Anonchotaenia zanthopygiae* n.sp. from *Zanthopygia n. arcissina* differs from *A. bobica* in that the strobila is up to 100 mm. or more in length and the cortex is much thicker. The testes number five to seven (usually six) and are arranged in continuous transverse row between the two dorsal excretory stems. It is distinguished from *A. brasiliensis* by the single layered internal longitudinal musculature. (viii) *Troglodytilepis troglodytis* n.g., n.sp. from *Troglodytes t. fumigatus* is characterized by the Y-shaped rostellar hooks and the absence of an external vesicle. The uterus has ventral cortical outgrowths through the inner longitudinal muscle layer. (ix) *Podicipitilepis laticauda* n.g., n.sp. from *Podiceps ruficollis japonicus* differs from *Vampirolepis* in that the rostellar hooks number eight and mature strobilae, measuring 0.95–1.38 mm., have seven to twelve proglottides. (x) *Howalewskius yoshidai* n.sp. from *Anas platyrhynchos domestica* resembles *Hymenolepis nichorhynchus* very closely but the cirrus is spicular and unarmed and the rostellar hooks have a very prominent guard. (xi) *Proterogynotaenia charadrii* n.sp. from *Charadrius alexandrinus dealbatus* has only up to 21 proglottides. The hooks of the rostellum are 72μ long and are not arranged in two definite rows. The cirrus is covered with spines about 7μ long. Three other species are listed, viz., *Tetrabothrius scoogi* Nybelin, 1916 from *Puffinus griseus*, *Anomotaenia globata* (Von Linstow, 1879) from *Alauda arvensis japonica*, and *Schistocephalus solidus* (Müller, 1776) from *Podiceps ruficollis japonicus*. *[Yamaguti states that the correct spelling of *Anonchotaenia* should be *Anonchotaenia*.]

R.T.L.

327—YAMAGUTI, S., 1956.—“Parasitic worms mainly from Celebes. Part 11. Cestodes of birds.” Okayama: S. Yamaguti, 41 pp.

In *Amoebotaenia longisacculus* n.sp. from *Gallus gallus* the cirrus, 0.18–0.24 mm., is much longer than in *A. sphenoides* and *A. oligorchis*. The vaginal opening into the genital atrium is immediately anteroventral to the cirrus and the number of testes is 9–14. *A. spinosa* n.sp. from *Gallus gallus* is characterized by its spiny cirrus. *Parovitaenia gorsakii* n.sp. from *Gorsakius pisagi* differs from *P. ardeolae* in the length of the rostellar hooks ($50\text{--}70\mu$) and of the cirrus pouch (0.12–0.17 mm.) and in the number of testes (5–7). The cirrus is heavily armed with spines and the genital pore does not alternate in successive segments. In *Cotugnia celebesensis* n.sp. from *Geopelia striata* the testes extend laterally to the excretory stems in every proglottis. It differs from *C. intermedia* Johri, 1934 which Yamaguti considers to be the same as *C. cuneata*. The specific characters of *Railletina (Paroniella) myzomelae* n.sp. from *Myzomela r. rubratra* are, apparently, to be found in the table which compares its various measurements with those of seven other species which also have over 30 testes. *R. (P.) macassarensis* n.sp. from *Gallus*

gallus has very small sucker hooks 5μ long (or under) whereas in *R. (P.) tinguiana* they are 7.5μ to 9.5μ long and in other species over 10μ . *Allohymenolepis mitudori* n.g., n.sp. is a member of Pseudhymenolepidinae from an unidentified meliphagid bird at Macassar, Celebes. Its general anatomy resembles *Pseudhymenolepis* in that the uterus breaks up into egg capsules but the genital pores alternate irregularly. *Mayhewia* n.g. contains *Mayhewia corvi* (Mayhew 1925) n. comb. for *Hymenolepis corvi* as genotype and *M. lamellaris* n.sp., found in *Lonchura maja* and *L. oryzivora*, of which the most important characters are the lamellar shape of the proglottides and the presence of about 20 unusually small rostellar hooks which are only $9.5-12\mu$ in length. The two antiporal testes are separated from the poral testis with the female reproductive organs occupying the interspace, an arrangement rare in species from Passeriformes but frequently present in species from other birds especially Anseriformes. *Passerilepis arcuiterus* n.sp. from *Ptilotis chrysotis* differs from *Passerilepis zosteropsis* in having a less prominent guard for the rostellar hook, an arcuate uterus and in having in the muscular sheath four, instead of twelve, inner bundles on each side, which disappear in the posterior gravid proglottides.

R.T.L.